United States
Department of
Agriculture

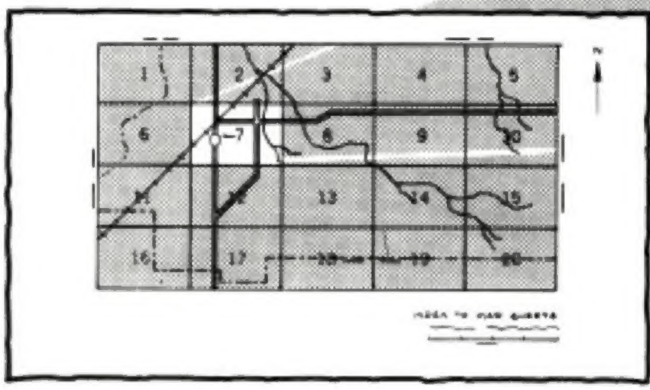
Soil
Conservation
Service

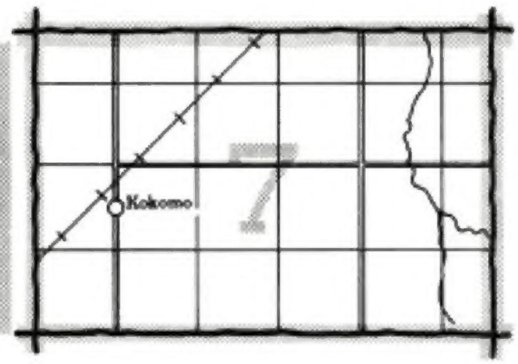
In Cooperation with
the Illinois
Agricultural
Experiment Station

Soil Survey of Iroquois County Illinois

HOW TO USE

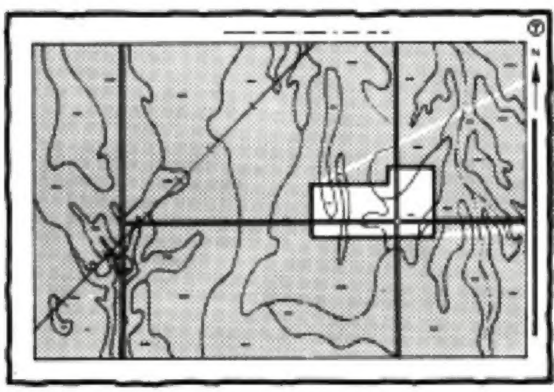
1. Locate your area of interest on the "Index to Map Sheets"

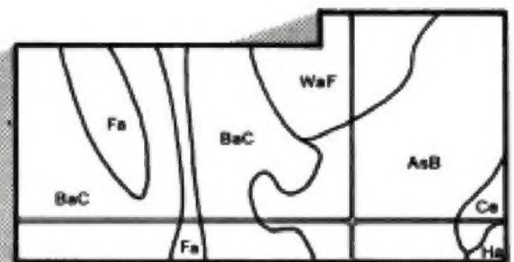




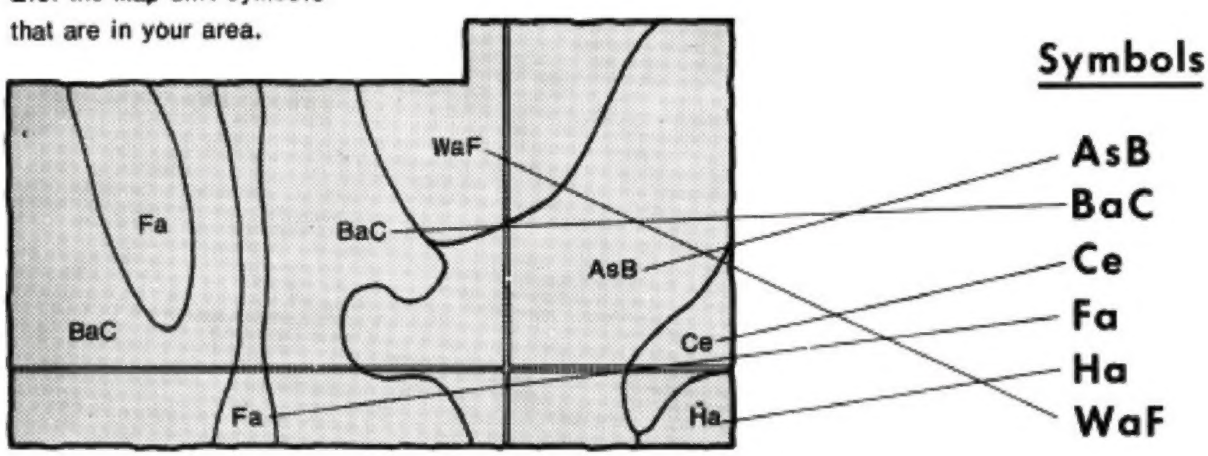
2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.



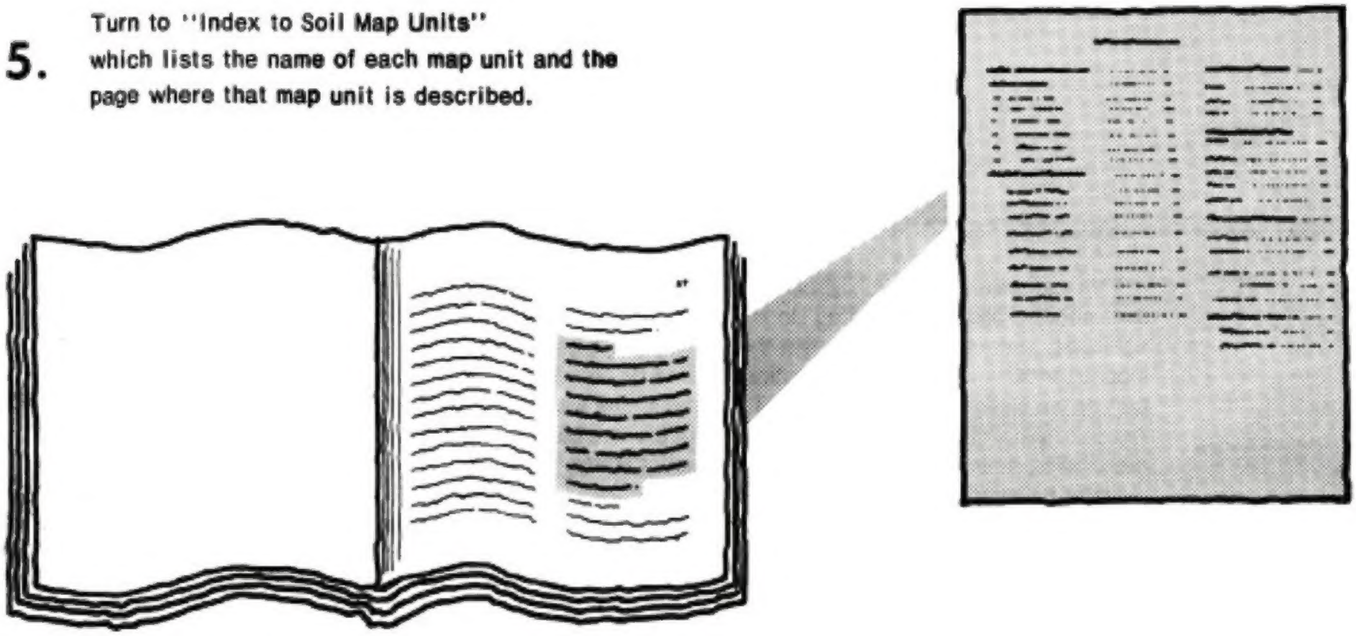


4. List the map unit symbols that are in your area.

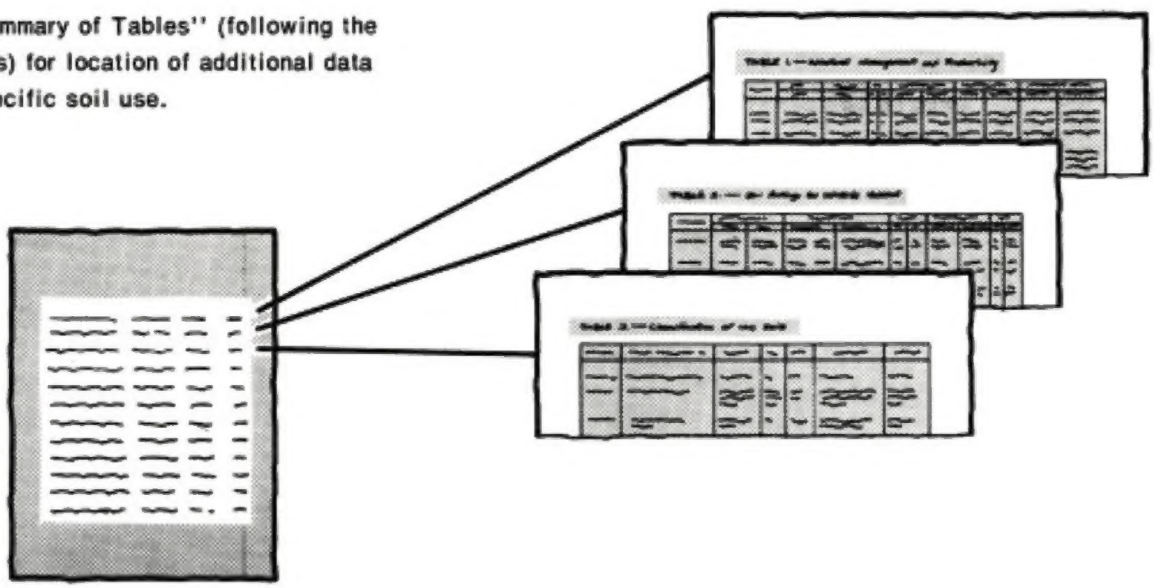


THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; to specialists in wildlife management, waste disposal, or pollution control.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

This survey was made cooperatively by the Soil Conservation Service and the Illinois Agricultural Experiment Station. It is part of the technical assistance furnished to the Iroquois County Soil and Water Conservation District. The cost was shared by the Iroquois County Board. Major fieldwork was performed in the period 1975-80. Soil names and descriptions were approved in 1980. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1980.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

This soil survey is Illinois Agricultural Experiment Station Soil Report 115.

Cover: An area of Corwin soils in Iroquois County. Grassed waterways and other measures that control erosion are needed on these soils.

contents

soil series

Issued October 1982

index to map units

summary of tables

foreword

This soil survey contains information that can be used in land-planning programs in Iroquois County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations inherent in the soil or hazards that adversely affect the soil, improvements needed to overcome the limitations or reduce the hazards, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

John J. Eckes
State Conservationist
Soil Conservation Service

soil survey of
Iroquois County, Illinois

By Linus M. Kiefer, Soil Conservation Service

Soils surveyed by Donald J. Fehrenbacher, Linus M. Kiefer, Loyal M. Reinebach, and Michael B. Walker, Soil Conservation Service, and William R. Kreznor, John E. Paschke, and Jack L. Simpson, Iroquois County

United States Department of Agriculture, Soil Conservation Service, in cooperation with the Illinois Agricultural Experiment Station

IROQUOIS COUNTY is in the east-central part of Illinois (fig. 1). It has a total of 718,080 acres, or about 1,122 square miles. It is bounded on the south by Vermilion and Ford Counties, on the west by Ford County, on the north by Kankakee County, and on the east by Indiana. In 1976, it had a population of 33,800 (*5*). Watseka is the county seat.

This survey updates a soil survey of Iroquois County published in 1951 (*12*). It provides more recent information and larger maps, which show the soils in greater detail.

general nature of the county

The following paragraphs describe the history and development of the county; the relief, physiography, and drainage; and the climate.

history and development

Gordon S. Hubbard, an Indian trader, was the first settler in what is now called Iroquois County (*3*). He established a temporary trading post during the winter of 1821-22 at a site near the present-day town of Watseka. The first permanent settlement was established in the spring of 1830. Rush settlement was established near the present-day town of Milford, and Montgomery, Concord, and Bunkum were established near the present-day town of Iroquois. The county was formally organized in 1833. It originally included Kankakee County and part of Will County. It was limited to its present-day boundaries in 1853. It was named after a confederation of Indian tribes.

The county has a well developed system of transportation. Interstate Highway 57, U.S. Highway 45, and State Route 1 cross the county from north to south and U.S. Highway 24 from east to west. Several state roads cross the county, and all-weather roads provide access to all of the rural areas. Railroads furnish freight service.

Farming has been a major enterprise since the county was settled. In 1974, the number of farms was 2,184 and the acreage of farmland was 94.3 percent of the total land area (*11*). Corn was grown on 302,518 acres and soybeans on 257,201 acres. About 13,550 acres was used for hay and 16,196 acres for pasture. Lesser acreages were used for wheat and vegetables.

The total number of cattle in 1974 was 39,714. Of this total, 4,098 were dairy cows. During the same year there were 34,697 swine, 3,511 sheep, and 589,691 hens and pullets of egg-laying age.

Several light industries are established in the county. These include manufacturers of business forms, farm equipment, and electronic parts in Watseka; a poultry processing plant in Loda; a cannery in Milford; and a hybrid seed corn plant in Milford.

relief, physiography, and drainage

Relief in Iroquois County is somewhat low. Elevation ranges from 605 feet above sea level in an area where the Iroquois River crosses the county line to 820 feet above sea level at a point about 2 miles southeast of Greer.

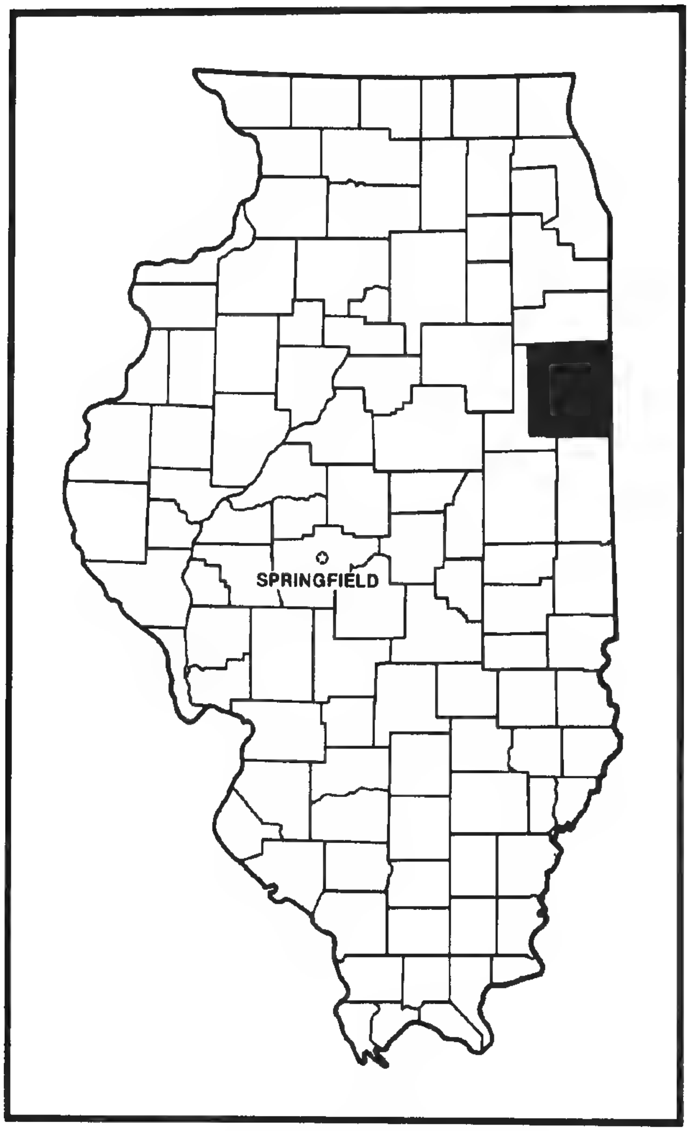


Figure 1.—Location of Iroquois County in Illinois.

The county is on the Kankakee Plain and the Bloomington Ridged Plain of the Central Lowland Province (*13*). The soils formed mainly in glacial material on uplands. Moraines are common throughout the county. They are interspersed by lacustrine and outwash deposits. A thin layer of loess mantles some areas, especially those in the southern and northwestern parts of the county. It thins to a trace throughout the rest of the county. The major bottom land areas are along Spring and Sugar Creeks and the Iroquois River.

Most of the county is drained by the Iroquois River and its tributaries. The water in these streams flows into the Illinois River through the Kankakee River. A small area along the western edge of the county is drained by tributaries of the North Fork of the Vermilion River, which drains into the Illinois River. An area in the southeastern part of the county is drained by the North Fork of another Vermilion River, which drains into the Wabash River.

climate

Prepared by the National Climatic Center, Asheville, North Carolina.

Iroquois County is cold in winter. In summer it generally is hot but has occasional cool spells. Precipitation falls as snow during frequent snowstorms in winter and chiefly as rain showers, which are often heavy, during the warmer periods, when warm, moist air moves in from the south. The amount of annual rainfall usually is adequate for corn, soybeans, and small grain.

Tornadoes and severe thunderstorms strike occasionally. They are of local extent and of short duration and cause only sparse damage in narrow belts. Hailstorms sometimes occur during the warmer periods. The hail falls in scattered small areas.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Watseka in the period 1951 to 1977. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 27 degrees F, and the average daily minimum temperature is 19 degrees. The lowest temperature on record, which occurred at Watseka on February 26, 1963, is minus 22 degrees. In summer the average temperature is 72 degrees, and the average daily maximum temperature is 84 degrees. The highest recorded temperature, which occurred on July 14, 1954, is 104 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

Of the total annual precipitation, about 25 inches, or more than 60 percent, usually falls in April through September, which includes the growing season for most crops. In 2 years out of 10, the rainfall in April through September is less than 20 inches. The heaviest 1-day rainfall during the period of record was 6.7 inches at Watseka on July 9, 1951. Thunderstorms occur on about 40 days each year, and most occur in summer.

Average seasonal snowfall is about 23 inches. The greatest snow depth at any one time during the period of record was 16 inches. On an average of 18 days, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 70 percent of the time possible in summer and 40 percent in winter. The prevailing wind is from the southwest. Average windspeed is highest, 12 miles per hour, in spring.

how this survey was made

Soil scientists made this survey to learn what soils are in the survey area, where they are, and how they can be used. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; and the kinds of rock. They dug many holes to study soil profiles. A profile is the sequence of natural layers, or horizons, in a soil. It extends from the surface down into the parent material, which has been changed very little by leaching or by plant roots.

The soil scientists recorded the characteristics of the profiles they studied and compared those profiles with others in nearby counties and in more distant places. They classified and named the soils according to nationwide uniform procedures. They drew the boundaries of the soils on aerial photographs. These photographs show trees, buildings, fields, roads, and other details that help in drawing boundaries accurately. The soil maps at the back of this publication were prepared from aerial photographs.

The areas shown on a soil map are called map units. Most map units are made up of one kind of soil. Some are made up of two or more kinds. The map units in this survey area are described under "General soil map units" and "Detailed soil map units."

While a soil survey is in progress, samples of some soils are taken for laboratory measurements and for engineering tests. All soils are field tested to determine their characteristics. Interpretations of those characteristics may be modified during the survey. Data are assembled from other sources, such as test results, records, field experience, and state and local specialists. For example, data on crop yields under defined management are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it can be used by farmers, woodland managers, engineers, planners, developers and builders, home buyers, and others.

general soil map units

The general soil map at the back of this publication shows the soil associations in this survey area. Each association has a distinctive pattern of soils, relief, and drainage. Each is a unique natural landscape. Typically, it consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one association can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

The names of the soils identified on the general soil map of this county do not fully agree with those of the soils identified on the general soil map in the published soil survey of the adjacent Kankakee County. Also, the lines on the maps do not perfectly join. Differences result from variations in the extent of the major soils in the associations or from conceptual changes in the soil classification system. They do not necessarily affect broad land use planning because the soils having different names are similar in terms of use and behavior.

association descriptions

Nearly level and gently sloping soils that have a very slowly permeable or slowly permeable subsoil; on uplands

These soils are on glacial till plains and moraines and on glacial lake plains.

1. Rowe-Clarence association

Poorly drained and somewhat poorly drained, silty soils that formed in colluvial sediments, loess, or silty material and in the underlying glacial till

This association consists mainly of nearly level and gently sloping soils on glacial till plains and moraines. Small depressional areas and steeper side slopes are common. Most areas are drained by ditches, small creeks, and drainageways. Slopes generally range from 0 to 6 percent.

This association makes up about 5 percent of the county. It is about 40 percent Rowe soils, 40 percent Clarence soils, and 20 percent minor soils.

The nearly level and depressional Rowe soils are in low lying areas. They are poorly drained and very slowly permeable. Typically, the surface layer is very dark grayish brown, friable silty clay loam about 7 inches thick. The subsurface layer also is very dark grayish brown, friable silty clay loam about 7 inches thick. The subsoil is about 34 inches thick. It is grayish brown and mottled. The upper part is friable silty clay, the next part is firm clay, and the lower part is firm and very firm silty clay. The substratum to a depth of 60 inches is mottled yellowish brown, gray, and dark grayish brown, very firm silty clay that has a high content of lime.

The nearly level and gently sloping Clarence soils are on convex slopes. They are somewhat poorly drained and very slowly permeable. Typically, the surface layer is very dark gray, friable silty clay loam about 7 inches thick. The subsurface layer is very dark grayish brown, friable silty clay loam about 4 inches thick. The subsoil is about 28 inches thick. It is mottled. The upper part is dark grayish brown, firm silty clay; the next part is dark grayish brown, firm clay; and the lower part is grayish brown and dark grayish brown, firm and very firm silty clay. The substratum to a depth of 60 inches is mottled dark grayish brown, light olive brown, and gray, very firm, calcareous silty clay.

Minor in this association are Monee, Rantoul, and Rutland soils. The poorly drained, nearly level Monee soils are in depressional areas. They have a light colored surface layer and subsurface layer. The very poorly drained, nearly level Rantoul soils are in depressional areas. They have a thick, dark surface layer and subsurface layer. The somewhat poorly drained, gently sloping Rutland soils are on convex slopes. Their subsoil contains less clay than that of either of the major soils.

This association is used mainly for cultivated crops or for pasture. It is moderately suited to the cultivated crops commonly grown in the county. The major limitations are a seasonal high water table, ponding, water erosion, the high content of clay, a moderate or low available water capacity, and the density of the subsoil. Subsurface drains do not function well because of the very slow

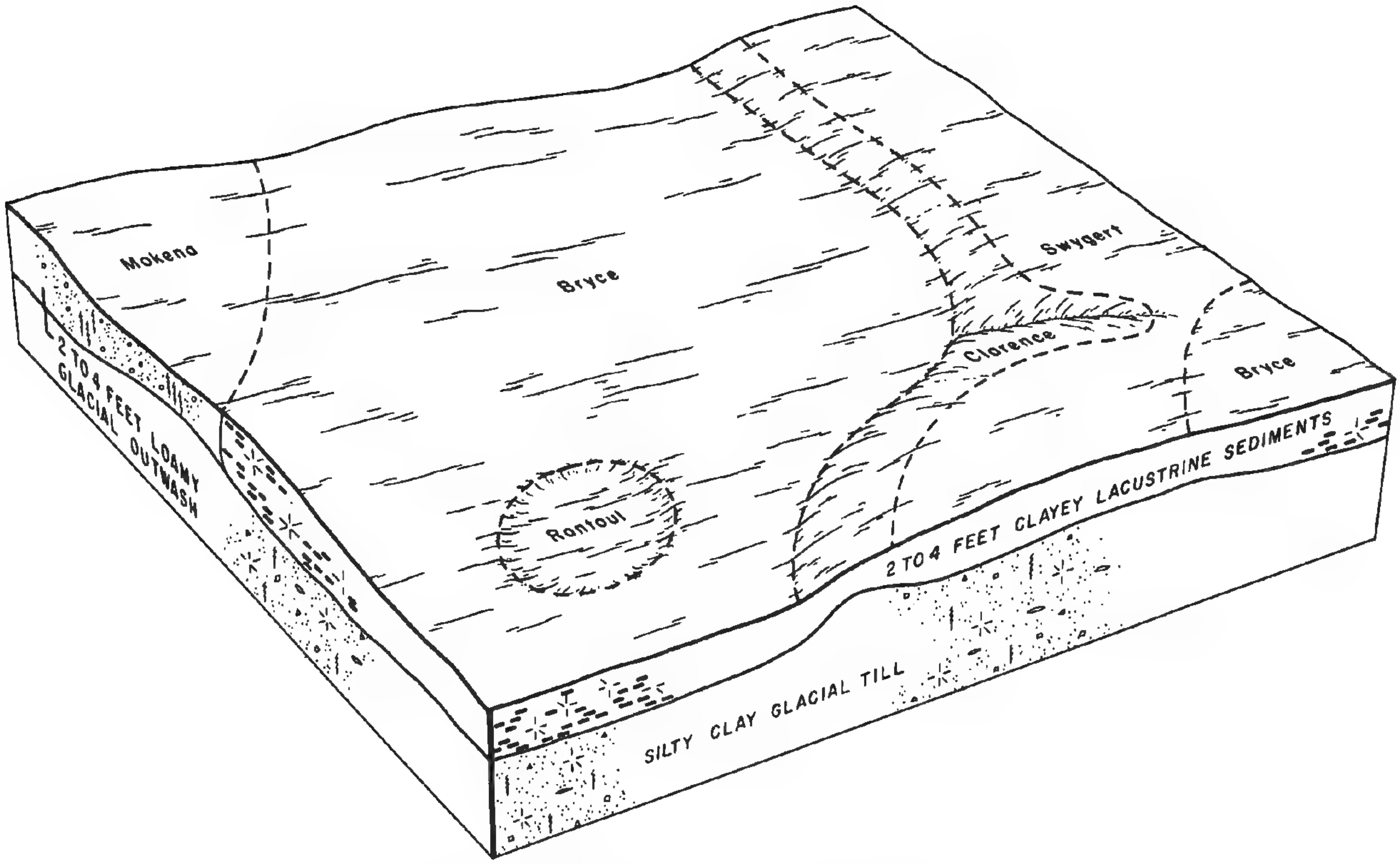


Figure 2.—Pattern of soils in the Bryce-Swygert association.

permeability. A surface drainage system generally is needed.

Mainly because of the seasonal high water table, the ponding, and the very slow permeability, this association is poorly suited to dwellings and septic tank absorption fields. The Rowe soils generally are unsuited to dwellings with basements and to septic tank absorption fields.

2. Bryce-Swygert association

Poorly drained and somewhat poorly drained, clayey and silty soils that formed in lacustrine deposits and the underlying glacial till

This association consists mainly of nearly level and gently sloping soils on glacial lake plains. These soils are underlain by glacial till. A thin layer of loess or silty material mantles some areas. Small depressional areas and steeper side slopes are common. Most areas are drained by ditches, small creeks, and drainageways. Slopes generally range from 0 to 5 percent.

This association makes up about 20 percent of the county. It is about 55 percent Bryce soils, 15 percent Swygert soils, and 30 percent minor soils (fig. 2).

The nearly level and depressional Bryce soils are in low lying areas. They are poorly drained and slowly permeable. Typically, the surface layer is black, friable silty clay about 13 inches thick. The subsoil to a depth of 60 inches is mottled silty clay. The upper part is black and friable, the next part is dark grayish brown, olive gray, and gray and is firm, and the lower part is gray, is very firm, and has a high content of lime.

The nearly level and gently sloping Swygert soils are on convex slopes and broad flats. They are somewhat poorly drained and are slowly permeable in the upper part of the subsoil and very slowly permeable in the lower part and in the substratum. Typically, the surface layer is black, friable silty clay loam about 7 inches thick. The subsurface layer is black, friable silty clay loam about 5 inches thick. The subsoil is mottled silty clay about 39 inches thick. The upper part is very dark

grayish brown and dark brown and is friable, the next part is yellowish brown and firm, and the lower part is light olive brown, very firm, and calcareous. The substratum to a depth of 60 inches is brown, mottled, very firm, calcareous silty clay.

Minor in this association are Clarence, Martinton, Mokena, Rantoul, and Rowe soils. The somewhat poorly drained, gently sloping, moderately eroded Clarence soils are on side slopes. The somewhat poorly drained, nearly level and gently sloping Martinton soils and the somewhat poorly drained, nearly level Mokena soils are on convex slopes. The very poorly drained, nearly level Rantoul soils are in depressional areas. They have a thick, dark surface layer and subsurface layer. The poorly drained, nearly level and depressional Rowe soils are in low lying areas.

This association is used mainly for cultivated crops or for pasture. It is well suited to the cultivated crops commonly grown in the county. The major limitations are a seasonal high water table ponding, the slow permeability, a moderate available water capacity, and water erosion. Subsurface drains do not function well because of the slow permeability. A surface drainage system generally is needed.

Mainly because of the seasonal high water table, the ponding, the slow permeability, and a high shrink-swell potential, this association is poorly suited to dwellings and septic tank absorption fields. The Bryce soils generally are unsuited to dwellings with basements and to septic tank absorption fields.

Nearly level and gently sloping soils that dominantly have a moderately slowly permeable subsoil; on uplands

These soils are on outwash plains, lake plains, till plains, and moraines.

3. Milford-Lisbon association

Poorly drained and somewhat poorly drained, silty soils that formed in lacustrine deposits or in loess or silty material and the underlying glacial till

This association consists mainly of nearly level soils on glacial till plains that are covered by loess and lacustrine deposits. It is characterized by irregular, elongated swells that are separated by nearly level and depressional areas. Steeper side slopes are common. Most areas are drained by ditches, small creeks, and drainageways. Slopes generally range from 0 to 2 percent.

This association makes up about 11 percent of the county. It is about 40 percent Milford soils, 35 percent Lisbon soils, and 25 percent minor soils (fig. 3).

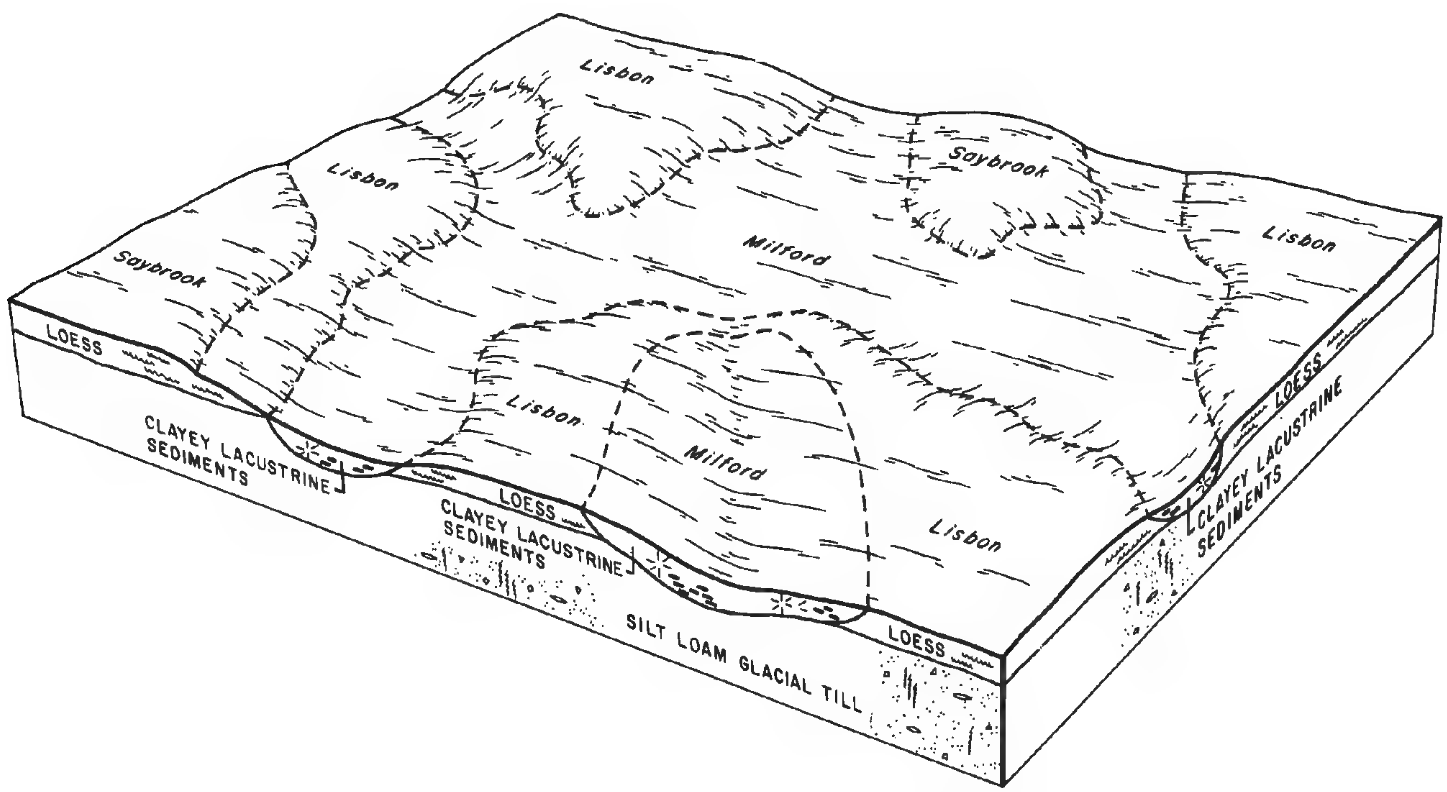


Figure 3.—Pattern of soils in the Milford-Lisbon association.

The nearly level and depressional Milford soils are in low lying areas. They are poorly drained and moderately slowly permeable. Typically, the surface layer is black, firm silty clay loam about 9 inches thick. The subsurface layer is black, firm silty clay about 9 inches thick. The subsoil is about 32 inches thick. It is mottled. The upper part is very dark gray, very firm silty clay; the next part is gray, very firm silty clay loam and clay loam; and the lower part is dark gray, firm silty clay loam stratified with thin layers of clay loam. The substratum to a depth of 60 inches is gray, mottled, firm clay loam stratified with fine sandy loam, silty clay loam, and silty clay.

The nearly level Lisbon soils are on convex slopes. They are somewhat poorly drained and are moderately permeable in the subsoil and moderately slowly permeable in the substratum. Typically, the surface layer is very dark gray, friable silt loam about 11 inches thick. The subsoil is about 28 inches thick. It is mottled. The upper part is dark grayish brown, friable silt loam; the next part is grayish brown, friable silty clay loam; and the lower part is dark grayish brown and grayish brown, firm silty clay loam. The substratum to a depth of 60 inches is multicolored, firm, calcareous silt loam.

Minor in this association are Andres, Bryce, and Saybrook soils. The somewhat poorly drained, nearly level Andres soils are on convex slopes. The poorly drained, nearly level and depressional Bryce soils are in low lying areas. The moderately well drained, gently sloping Saybrook soils are on convex slopes.

This association is used mainly for cultivated crops or for pasture. In some small areas it is used for vegetable crops, such as sweet corn, asparagus, lima beans, and pumpkins. It is well suited to the cultivated crops commonly grown in the county. The major limitations are a seasonal high water table, ponding, water erosion, and the moderately slow permeability of the Milford soils. A drainage system generally is needed. Subsurface drains function well in most areas.

Mainly because of the seasonal high water table, the ponding, and the moderate or moderately slow permeability, this association is poorly suited to dwellings and septic tank absorption fields. The Milford soils generally are unsuited to septic tank absorption fields.

4. Ashkum-Elliott association

Poorly drained and somewhat poorly drained, silty and loamy soils that formed in loess or silty material and the underlying glacial till

This association consists mainly of nearly level and gently sloping soils on plains and moraines. Small depressional areas and steeper side slopes are common. Most areas are drained by ditches, small creeks, and drainageways. Slopes generally range from 0 to 5 percent.

This association makes up about 6 percent of the county. It is about 40 percent Ashkum and similar soils, 25 percent Elliott soils, and 35 percent minor soils.

The nearly level Ashkum soils are on the lower lying foot slopes and along upland drainageways. They are poorly drained and moderately slowly permeable. Typically, the surface layer is black, friable silty clay loam about 12 inches thick. The subsoil is mottled silty clay loam about 38 inches thick. The upper part is grayish brown and firm, the next part is olive and firm, and the lower part is gray and very firm. The substratum to a depth of 60 inches is gray, mottled, very firm silty clay loam.

The nearly level and gently sloping Elliott soils are on convex slopes. They are somewhat poorly drained and are moderately slowly permeable in the subsoil and slowly permeable in the substratum. Typically, the surface layer is very dark gray, friable loam about 9 inches thick. The subsurface layer is very dark gray, friable loam about 5 inches thick. The subsoil is about 24 inches thick. It is mottled. The upper part is dark brown, friable clay; the next part is brown, firm silty clay; and the lower part is yellowish brown, firm, calcareous silty clay loam. The substratum to a depth of 60 inches is yellowish brown, mottled, firm, calcareous silty clay loam.

Minor in this association are the somewhat poorly drained, nearly level Andres soils on convex slopes; the moderately well drained, moderately sloping Chatsworth soils on side slopes; the poorly drained, nearly level Reddick soils; and the moderately well drained, gently sloping Varna soils on convex slopes.

This association is used mainly for cultivated crops or for pasture. It is well suited to the cultivated crops commonly grown in the county. The major limitations are a seasonal high water table, ponding, water erosion, and the moderately slow permeability. A drainage system generally is needed. Subsurface drains function well in most areas.

Mainly because of the seasonal high water table, the ponding, and the moderately slow permeability, this association is poorly suited to dwellings and septic tank absorption fields. The Ashkum soils generally are unsuited to dwellings with basements and to septic tank absorption fields.

5. Milford-Martinton association

Poorly drained and somewhat poorly drained, silty soils that formed in lacustrine deposits

This association consists mainly of nearly level and gently sloping soils on glacial lake plains. Small depressional areas and steeper side slopes are common. Most areas are drained by ditches, small creeks, and drainageways. Slopes generally range from 0 to 5 percent.

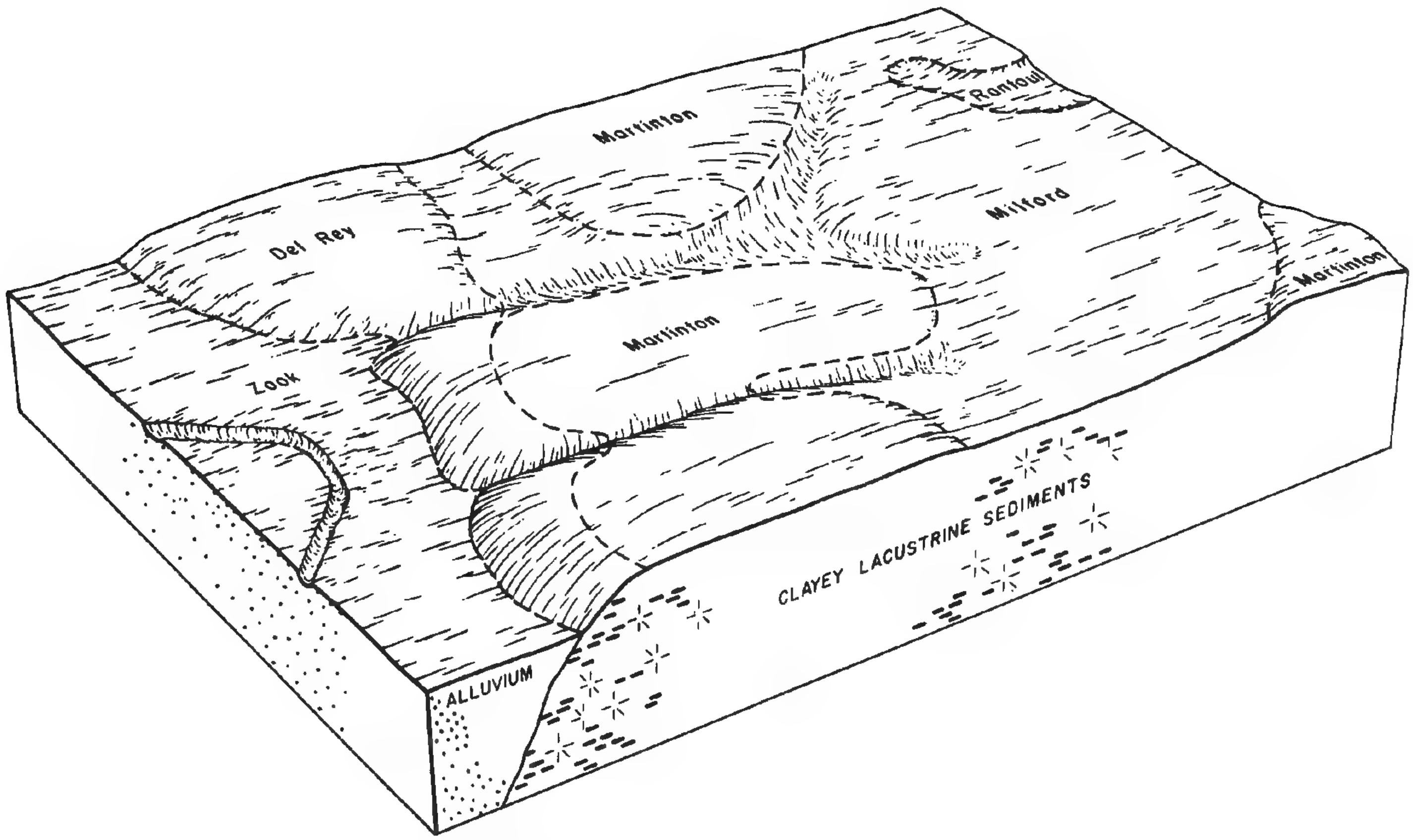


Figure 4.—Pattern of soils in the Milford-Martinton association.

This association makes up about 16 percent of the county. It is about 45 percent Milford soils, 35 percent Martinton and similar soils, and 20 percent minor soils (fig. 4).

The nearly level and depressional Milford soils are in low lying areas. They are poorly drained and moderately slowly permeable. Typically, the surface layer is black, firm silty clay loam about 9 inches thick. The subsurface layer is black, firm silty clay about 9 inches thick. The subsoil is about 32 inches thick. It is mottled. The upper part is very dark gray, very firm silty clay; the next part is gray, very firm silty clay loam and clay loam; and the lower part is dark gray, firm silty clay loam stratified with thin layers of clay loam. The substratum to a depth of 60 inches is gray, mottled, firm clay loam stratified with fine sandy loam, silty clay loam, and silty clay.

The nearly level and gently sloping Martinton soils are on convex slopes and broad flats. They are somewhat poorly drained and moderately slowly permeable. Typically, the surface layer is black, friable silty clay loam about 7 inches thick. The subsurface layer is black, friable silty clay loam about 10 inches thick. The subsoil is about 29 inches thick. It is mottled. The upper part is dark grayish brown, firm silty clay loam and silty clay; the next part is olive gray, firm silty clay loam; and the lower part is olive, friable silt loam. The substratum to a depth of 60 inches is mottled gray and yellowish brown, friable, calcareous silt loam and fine sandy loam.

Minor in this association are Bryce, Del Rey, Rantoul, and Zook soils. The poorly drained, nearly level and depressional Bryce soils are in low lying areas. They have a light colored surface layer and subsurface layer. The somewhat poorly drained, nearly level and gently sloping Del Rey soils are on convex slopes and broad flats. They have a light colored surface layer. The very poorly drained, nearly level Rantoul soils are in depressions. They have a thick, dark surface layer and subsurface layer. The very poorly drained, nearly level Zook soils are on bottom land.

This association is used mainly for cultivated crops or

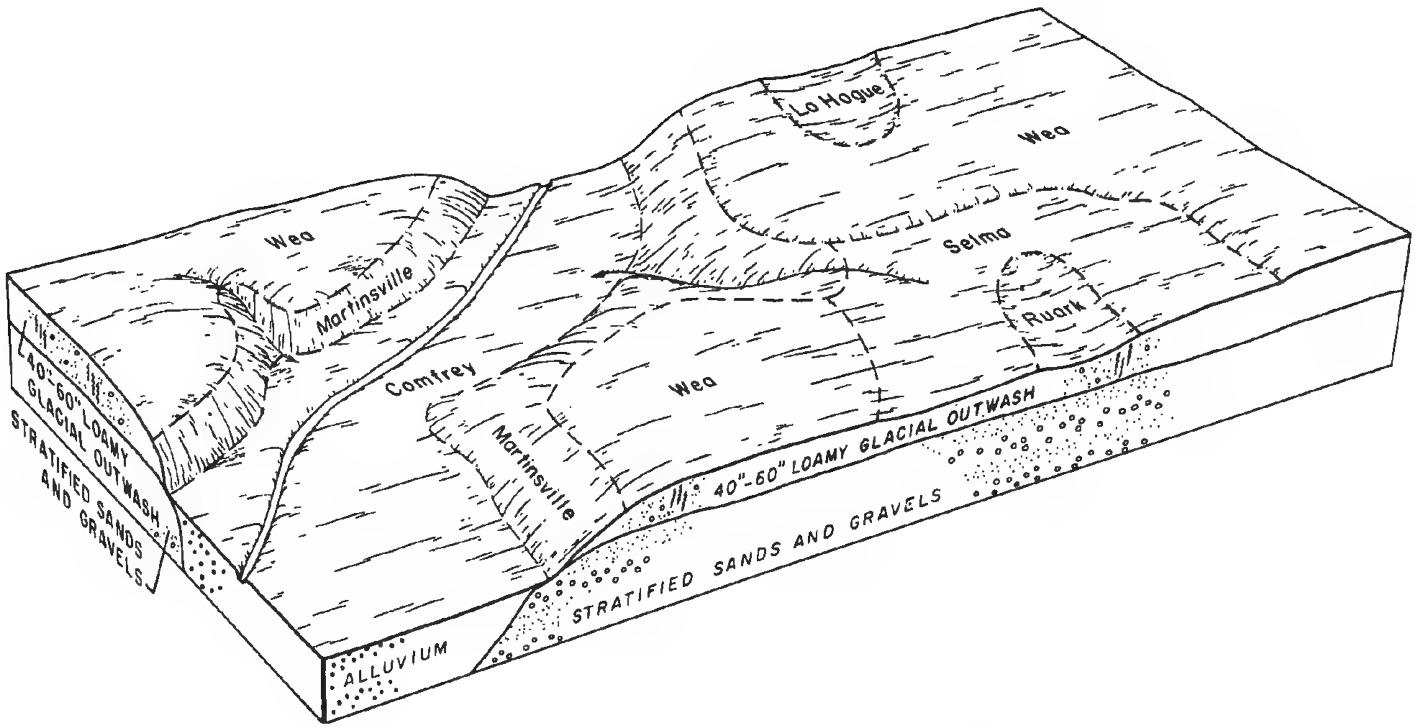


Figure 5.—Pattern of soils in the Wea-Comfrey association.

for pasture. It is well suited to the cultivated crops commonly grown in the county. The major limitations are a seasonal high water table, ponding, water erosion, and the moderately slow permeability. Also, the soils on narrow bottom land are flooded for brief periods. A drainage system generally is needed. Subsurface drains function well in most areas.

Mainly because of the seasonal high water table, the ponding, and the moderately slow permeability, this association is poorly suited to dwellings and septic tank absorption fields. The Milford soils generally are unsuited to septic tank absorption fields.

Nearly level soils that have a moderately permeable subsoil; on uplands and bottom land

These soils are on outwash plains and flood plains.

6. Wea-Comfrey association

Well drained and poorly drained, silty and loamy soils that formed in glacial outwash and alluvium

This association consists mainly of nearly level soils on outwash plains in the uplands and on the adjacent flood plains. Small depressional areas and steeper side slopes are common. The soils on flood plains are frequently flooded. Slopes generally range from 0 to 2 percent.

This association makes up about 2 percent of the county. It is about 45 percent Wea and similar soils, 25 percent Comfrey soils, and 30 percent minor soils (fig. 5).

The nearly level Wea soils are on broad flats and convex slopes. They are well drained and are moderately permeable in the subsoil and very rapidly permeable in the substratum. Typically, the surface layer is black, friable silt loam about 10 inches thick. The subsurface layer is very dark grayish brown, friable silt loam about 4 inches thick. The subsoil is about 27 inches thick. The upper part is dark yellowish brown, friable silt loam; the next part is dark yellowish brown, friable clay loam; and the lower part is brown, firm gravelly loam. The substratum to a depth of 60 inches is mottled brown and light yellowish brown, loose sand and gravel.

The nearly level Comfrey soils are on flood plains, on alluvial fans, and in some drainageways that extend into the uplands. They are poorly drained and moderately permeable. They are frequently flooded for brief periods from April through June. Typically, the surface layer is

black, friable loam about 11 inches thick. The subsurface layer is black and very dark gray, friable loam about 14 inches thick. The subsoil is firm clay loam about 16 inches thick. The upper part is very dark gray and mottled, and the lower part is mottled dark gray and yellowish brown. The substratum to a depth of 60 inches is mottled gray and yellowish brown, friable loam.

Minor in this association are La Hogue, Martinsville, Roby, Ruark, and Selma soils. The somewhat poorly drained, nearly level La Hogue soils are in the slightly lower areas on terraces and on knolls on flood plains. The well drained, gently sloping to strongly sloping Martinsville soils are on the slope breaks between the Wea and Comfrey soils. They have a light colored surface layer. The somewhat poorly drained, nearly level Roby soils are on convex slopes. The poorly drained Ruark soils are in shallow depressions and drainageways. The poorly drained, nearly level and depressional Selma soils are in broad areas and narrow drainageways on terraces.

This association is used mainly for cultivated crops or for pasture. In some small areas it is used for vegetable crops, such as asparagus and sweet corn. It is well suited to the cultivated crops commonly grown in the county. The major limitations are a seasonal high water table in the Comfrey soils and the frequent flooding of those soils. A drainage system and measures that control floodwater generally are needed. Subsurface drains function well.

The Wea soils are moderately suited to dwellings and well suited to septic tank absorption fields. The Comfrey soils generally are unsuited to dwellings and septic tank absorption fields, mainly because of the seasonal high water table and the flooding.

7. Ridgeville-Selma association

Somewhat poorly drained and poorly drained, loamy soils that formed in glacial outwash

This association consists mainly of nearly level soils on glacial outwash plains. Small depressional areas and steeper side slopes are common. Most areas are drained by ditches, small creeks, and drainageways. Slopes generally range from 0 to 2 percent.

This association makes up about 11 percent of the county. It is about 35 percent Ridgeville and similar soils, 30 percent Selma soils, and 35 percent minor soils (fig. 6).

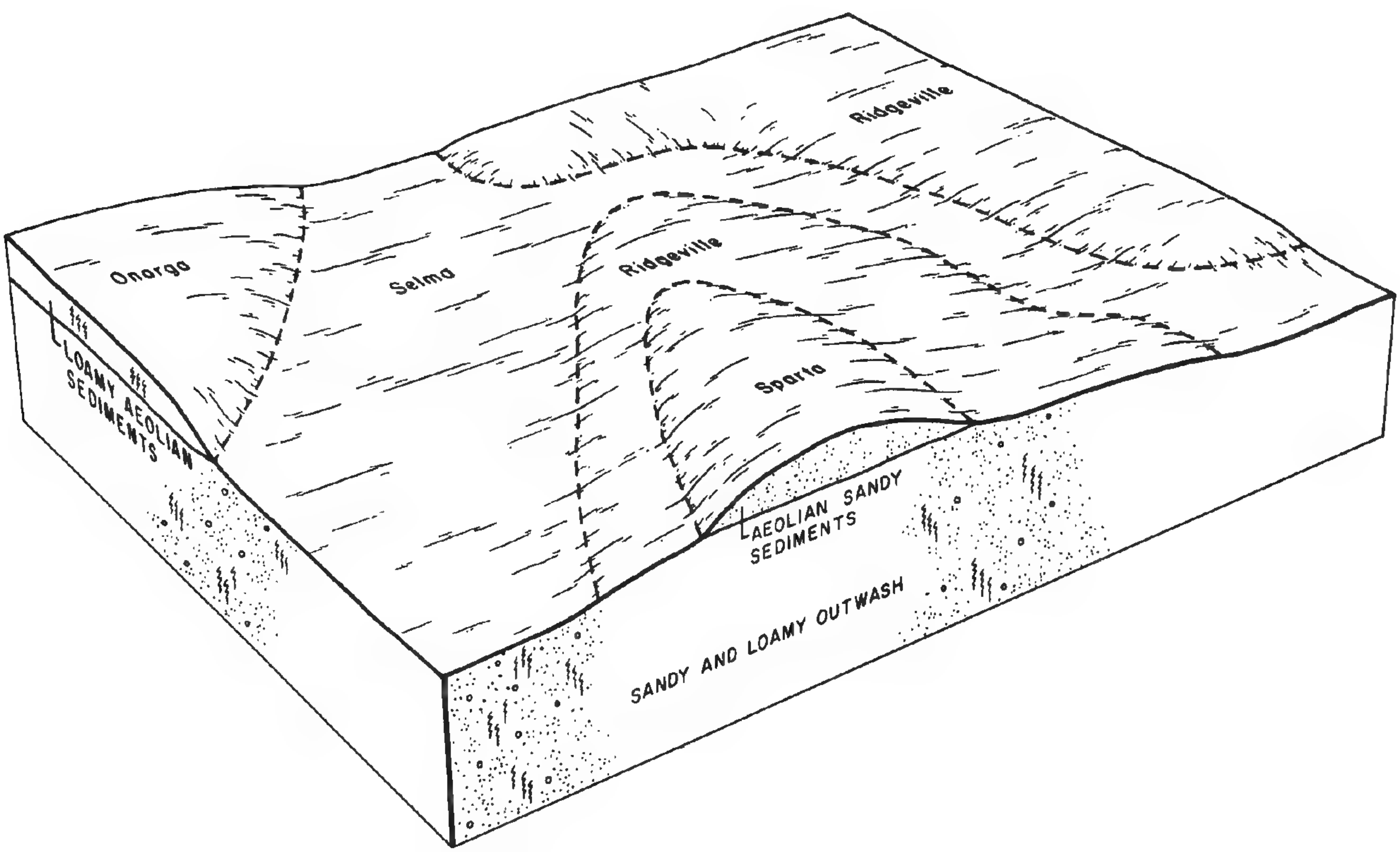


Figure 6.—Pattern of soils in the Ridgeville-Selma association.

The nearly level Ridgeville soils are on convex slopes and broad flats. They are somewhat poorly drained and are moderately permeable in the subsoil and moderately rapidly permeable in the substratum. Typically, the surface layer is very dark brown, very friable fine sandy loam about 8 inches thick. The subsurface layer is very dark gray, very friable fine sandy loam about 8 inches thick. The subsoil is about 31 inches thick. It is mottled. The upper part is dark grayish brown, friable fine sandy loam; the next part is grayish brown, firm sandy clay loam and fine sandy loam; and the lower part is yellowish brown, very friable loamy fine sand. The substratum to a depth of 60 inches is light brownish gray, mottled, loose fine sand.

The nearly level Selma soils are in broad, irregularly shaped areas and in narrow drainageways. They are poorly drained and are moderately permeable in the subsoil and moderately rapidly permeable in the substratum. Typically, the surface layer is black, friable loam about 9 inches thick. The subsurface layer is very dark gray, friable loam about 3 inches thick. The subsoil is about 32 inches thick. The upper part is dark gray and gray, mottled, friable loam; the next part is mottled gray and yellowish brown, friable loam; and the lower part is gray, mottled, very friable sandy loam. The substratum to a depth of 60 inches is gray, mottled, friable stratified silt loam and loamy sand.

Minor in this association are the excessively drained, gently sloping and moderately sloping Chelsea soils; the somewhat poorly drained, nearly level Morocco soils; the well drained, gently sloping Onarga soils; and the excessively drained, gently sloping Sparta soils. All of the minor soils are on convex slopes.

This association is used mainly for cultivated crops or for pasture. It is well suited to the cultivated crops commonly grown in the county. The major limitations are a seasonal high water table, ponding, a moderate available water capacity, and soil blowing. A drainage system generally is needed. Subsurface drains function well.

Mainly because of the seasonal high water table, the ponding, and the moderately rapid permeability in the substratum, this association is poorly suited to dwellings and septic tank absorption fields. The Selma soils generally are unsuited to septic tank absorption fields.

Nearly level soils that have a moderately permeable or moderately slowly permeable subsoil; on uplands

These soils are on outwash plains, till plains, and lake plains.

8. Selma-La Hogue-Odell association

Poorly drained and somewhat poorly drained, loamy and silty soils that formed in glacial outwash and glacial till

This association consists mainly of nearly level soils on glacial till plains that in many areas are covered by glacial outwash. A thin or moderately thick layer of loess or silty material mantles some areas. Irregular knolls are separated by broad to narrow flat areas and small depressions. Steeper side slopes are common. Most areas are drained by ditches, small creeks, and drainageways. Slopes generally range from 0 to 2 percent.

This association makes up about 11 percent of the county. It is about 35 percent Selma and similar soils, 20 percent La Hogue soils, 15 percent Odell soils, and 30 percent minor soils (fig. 7).

The nearly level Selma soils are in broad, irregularly shaped areas and in narrow drainageways. They are poorly drained and are moderately permeable in the subsoil and moderately rapidly permeable in the substratum. Typically, the surface layer is black, friable loam about 9 inches thick. The subsurface layer is very dark gray, friable loam about 3 inches thick. The subsoil is about 32 inches thick. The upper part is dark gray and gray, mottled, friable loam; the next part is mottled gray and yellowish brown, friable loam; and the lower part is gray, mottled, very friable sandy loam. The substratum to a depth of 60 inches is gray, mottled, friable stratified silt loam and loamy sand.

The nearly level La Hogue soils are on convex slopes. They are somewhat poorly drained and are moderately permeable in the subsoil and moderately rapidly permeable in the substratum. Typically, the surface layer is black, friable loam about 9 inches thick. The subsurface layer is very dark grayish brown, friable silt loam about 3 inches thick. The subsoil is about 34 inches thick. It is friable. The upper part is dark brown, mottled silty clay loam; the next part is yellowish brown and dark yellowish brown, mottled clay loam and loam; and the lower part is strong brown and mottled dark yellowish brown, dark grayish brown, and yellowish red loam and sandy loam. The substratum to a depth of 60 inches is mottled brownish yellow, dark yellowish brown, and dark grayish brown, friable loamy fine sand.

The nearly level Odell soils are on convex slopes. They are somewhat poorly drained and moderately slowly permeable. Typically, the surface layer is very dark gray, friable silt loam about 7 inches thick. The subsurface layer is very dark gray, friable silt loam about 5 inches thick. The subsoil is about 27 inches thick. The upper part is dark grayish brown and dark brown, mottled, friable clay loam; the next part is brown, mottled, firm clay loam; and the lower part is yellowish brown and pale brown, firm, calcareous loam. The substratum to a depth of 60 inches is mottled yellowish brown and light brownish gray, firm, calcareous loam.

Minor in this association are Corwin, Harco, Jasper, Milford, and Pella soils. The moderately well drained, gently sloping and moderately sloping Corwin soils are on the higher parts of the landscape and on side slopes. The somewhat poorly drained, nearly level Harco soils are on convex slopes. The well drained, gently sloping

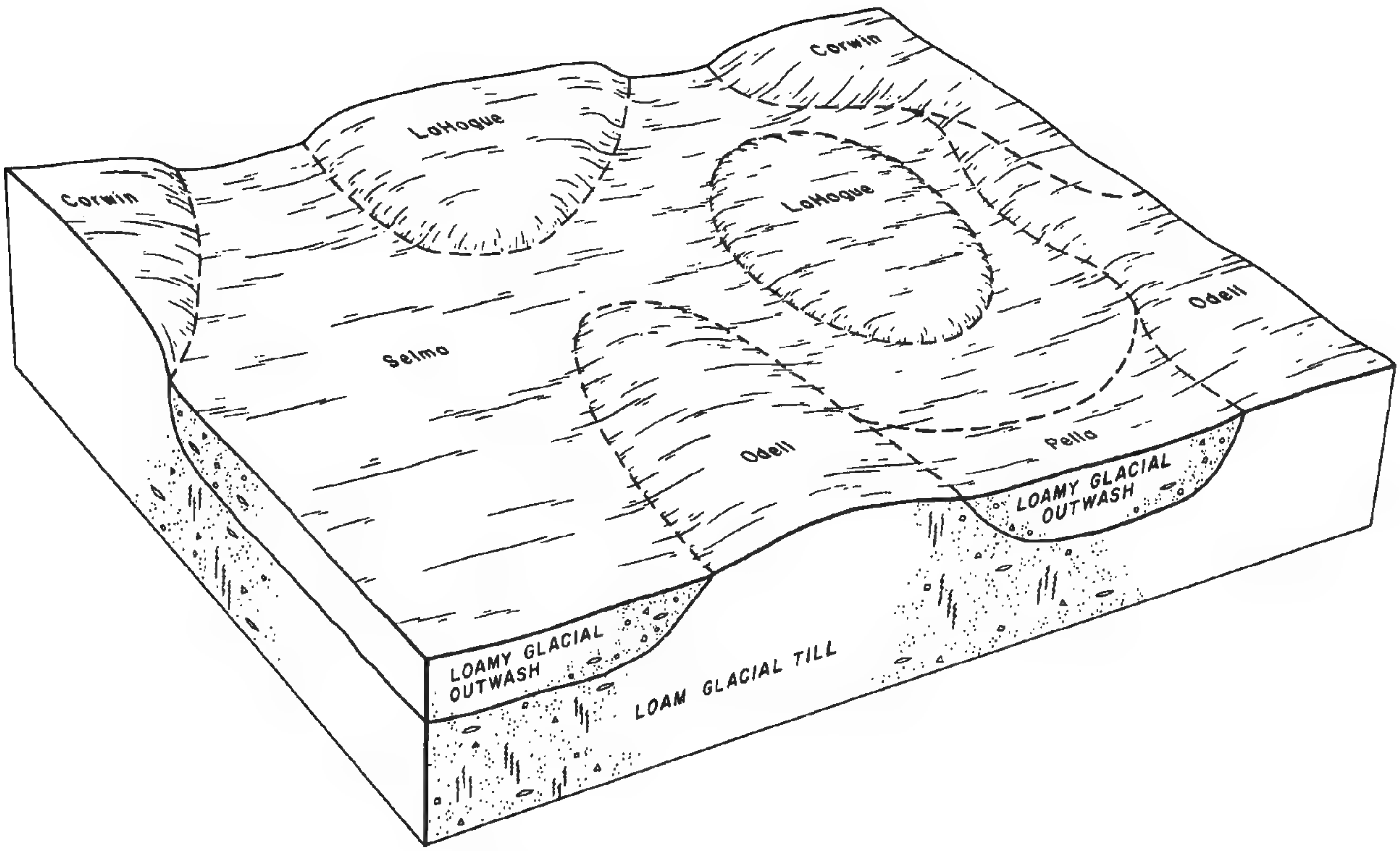


Figure 7.—Pattern of soils in the Selma-La Hogue-Odell association.

Jasper soils also are on convex slopes. The poorly drained, nearly level and depressional Milford and Pella soils are in low lying areas.

This association is used mainly for cultivated crops or for pasture. It is well suited to the cultivated crops commonly grown in the county. The major limitations are a seasonal high water table, ponding, water erosion, and the moderately slow permeability in the Odell soils. A drainage system generally is needed. Subsurface drains function well.

Mainly because of the seasonal high water table, the ponding, and the moderately slow permeability in the Odell soils, this association is poorly suited to dwellings and septic tank absorption fields. The Selma soils generally are unsuited to septic tank absorption fields.

9. Pella-Milford association

Poorly drained, loamy and silty soils that formed in glacial outwash and lacustrine deposits

This association consists mainly of nearly level soils on broad glacial outwash plains and lake plains. Small depressional areas and irregular swells and knolls are common. Most areas are drained by ditches, small creeks, and drainageways. Slopes generally range from 0 to 2 percent.

This association makes up about 11 percent of the county. It is about 50 percent Pella and similar soils, 15 percent Milford soils, and 35 percent minor soils.

The nearly level and depressional Pella soils are in broad, irregularly shaped areas and in narrow drainageways. They are poorly drained and moderately permeable. Typically, the surface layer is black, firm clay loam about 6 inches thick. The subsurface layer is black, friable clay loam about 7 inches thick. The subsoil is about 25 inches thick. It is firm. The upper part is very dark gray clay loam; the next part is olive gray, mottled clay loam and silty clay loam; and the lower part is gray, mottled loam and silt loam. The substratum to a depth of 60 inches is gray and olive gray, mottled, firm, calcareous sandy loam, silt loam, and clay loam.

The nearly level and depressional Milford soils are in low lying areas. They are poorly drained and moderately slowly permeable. Typically, the surface layer is black, firm silty clay loam about 9 inches thick. The subsurface layer is black, firm silty clay about 9 inches thick. The

subsoil is about 32 inches thick. It is mottled. The upper part is very dark gray, very firm silty clay; the next part is gray, very firm silty clay loam and clay loam; and the lower part is dark gray, firm silty clay loam stratified with thin layers of clay loam. The substratum to a depth of 60 inches is gray, mottled, firm clay loam stratified with fine sandy loam, silty clay loam, and silty clay.

Minor in this association are the well drained, gently sloping Jasper soils; the somewhat poorly drained, nearly level La Hogue soils; the well drained, gently sloping Martinsville soils; and the somewhat poorly drained, nearly level and gently sloping Martinton soils. All of the minor soils are on convex slopes.

This association is used mainly for cultivated crops or for pasture. It is well suited to the cultivated crops commonly grown in the county. The major limitations are a seasonal high water table, ponding, and the moderately slow permeability in the Milford soils. A drainage system generally is needed. Subsurface drains function well.

This association is poorly suited to dwellings and generally is unsuited to septic tank absorption fields. The seasonal high water table, the ponding, and the moderate or moderately slow permeability are the major limitations.

Nearly level to moderately sloping soils that have a moderately rapidly permeable or rapidly permeable subsoil; on uplands

These soils are on outwash plains in the uplands.

10. Gilford-Chelsea-Watseka association

Very poorly drained, excessively drained, and somewhat poorly drained, loamy and sandy soils that formed in glacial outwash and in wind- or water-deposited sand

This association consists of nearly level to moderately sloping soils on glacial outwash plains. Small depressional areas and steeper beach ridges and dunes are common. Most areas are drained by ditches, small

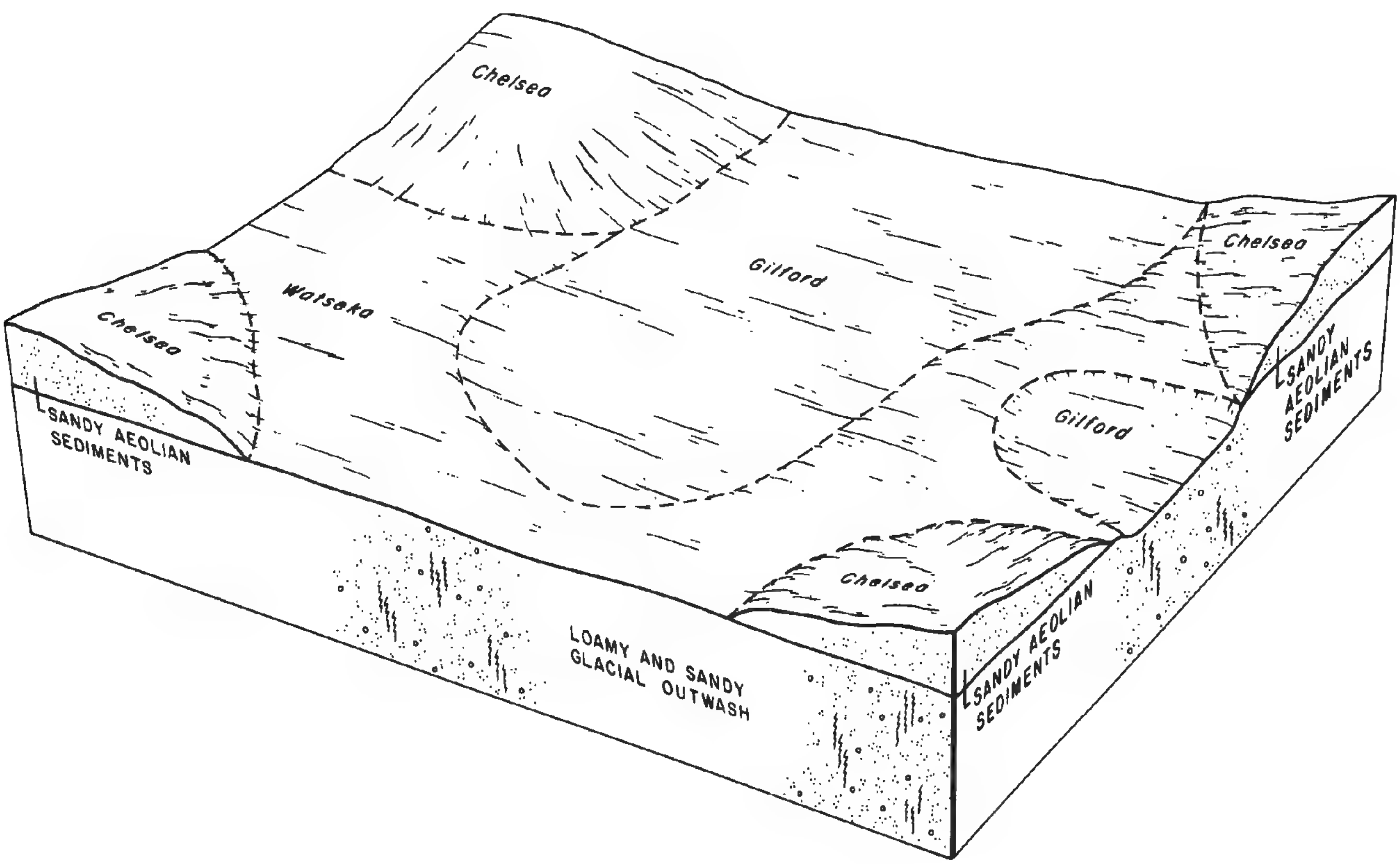


Figure 8.—Pattern of soils in the Gilford-Chelsea-Watseka association.

creeks, and drainageways. Slopes generally range from 0 to 12 percent.

This association makes up about 7 percent of the county. It is about 30 percent Gilford soils, 30 percent Chelsea and similar soils, 20 percent Watseka and similar soils, and 20 percent minor soils (fig. 8).

The nearly level Gilford soils are on concave slopes and in depressions. They are very poorly drained and are moderately rapidly permeable in the subsoil and rapidly permeable in the substratum. Typically, the surface layer is black, very friable very fine sandy loam about 9 inches thick. The subsurface layer is black, very friable very fine sandy loam about 6 inches thick. The subsoil is very fine sandy loam about 22 inches thick. The upper part is very dark gray and friable, and the lower part is dark grayish brown and grayish brown, mottled, and friable and very friable. The substratum to a depth of 60 inches is grayish brown and dark gray, mottled, loose loamy fine sand and fine sand.

The gently sloping and moderately sloping Chelsea soils are on convex slopes. They are excessively drained and rapidly permeable. Typically, the surface layer is dark brown, very friable fine sand about 8 inches thick. The subsurface layer is dark yellowish brown and yellowish brown, loose fine sand about 33 inches thick. The subsoil to a depth of 60 inches is dark yellowish brown, very friable fine sand that has bands of brown loamy fine sand.

The nearly level Watseka soils are on convex slopes and broad flats. They are somewhat poorly drained and rapidly permeable. Typically, the surface layer is black, very friable loamy sand about 8 inches thick. The subsurface layer is very dark gray, mottled, very friable loamy fine sand about 6 inches thick. The subsoil is mottled fine sand about 23 inches thick. The upper part is dark yellowish brown and very friable, and the lower part is yellowish brown and loose. The substratum to a depth of 60 inches is mottled grayish brown, brown, and yellowish brown, loose fine sand.

Minor in this association are Aurelius, Granby, Roby,

Figure 9.—A flooded area of Comfrey soils along Sugar Creek.

and Wesley soils. The very poorly drained, nearly level and depressional Aurelius soils are in bogs. The very poorly drained, nearly level Granby soils are on flats. The somewhat poorly drained, nearly level Roby soils are on convex slopes and narrow flats. The somewhat poorly drained, nearly level Wesley soils are on convex slopes.

This association is used mainly for cultivated crops or for pasture. The Gilford soils are well suited to cultivated crops and to pasture. The Watseka soils are only moderately suited, however, and the Chelsea soils are poorly suited to cultivated crops and only moderately suited to pasture. The major limitations are a seasonal high water table in the Gilford and Watseka soils, a low available water capacity in the Watseka and Chelsea soils, and soil blowing on all three soils. A drainage system generally is needed. Subsurface drains function well in most areas.

Because of the rapid permeability of all the major soils, ponding on the Gilford soils, and a seasonal high water table in the Watseka soils, this association generally is unsuited to septic tank absorption fields. The Chelsea soils are well suited or moderately suited to dwellings, but the Gilford soils are poorly suited because of ponding and the Watseka soils are poorly suited because of a seasonal high water table.

broad land use considerations

William R. Kreznor, soil scientist, Iroquois County, helped prepare this section.

The soils in Iroquois County vary widely in their suitability for major land uses. Most of the acreage is used for cultivated crops, primarily corn and soybeans. The major soils in the associations generally are well suited to cultivated crops. The main limitations in the Rowe-Clarence, Bryce-Swygert, Milford-Lisbon, Ashkum-Elliott, Milford-Martinton, Selma-La Hogue-Odell, and Pella-Milford associations are water erosion, a seasonal high water table, and ponding. Also, a low or moderate available water capacity is a limitation in the Rowe-Clarence association. The main limitations in the Ridgeville-Selma and Gilford-Chelsea-Watseka associations are soil blowing, a seasonal high water table, ponding, and a low available water capacity. The seasonal high water table in Comfrey soils and the frequent flooding of these soils are the main limitations in the Wea-Comfrey association (fig. 9). The floodwater causes moderate to severe crop damage.

A small acreage in the county is pastured. All associations are suitable for grasses and legumes. A low or moderate available water capacity is the principal

Figure 10.—A city park on Wea soils along Sugar Creek. Many sites suitable for recreational development are along the waterways in the county.

limitation in the Rowe-Clarence and Gilford-Chelsea-Watseka associations. Pasture rotation and other measures that prevent overgrazing help to overcome this limitation.

Only some small areas in the county are wooded. They are primarily adjacent to creeks and streams. The associations generally are suited to trees. The equipment limitation is moderate or severe, however, because most of the soils are naturally wet. This limitation can be overcome by operating the equipment during the drier periods. Seedling mortality is moderate or severe on the Gilford-Chelsea-Watseka association because of a low available water capacity. Timely planting and control of plant competition around new seedlings help to overcome this limitation.

Some areas in the county are developed or built up for urban uses. Except for the Wea soils in the Wea-Comfrey association, all the major soils in the associations are poorly suited to building site development. Wetness, low strength, the shrink-swell potential, and frost action are the principal limitations. Small areas of minor soils that are moderately suited to building site development generally are available in each association. The Gilford-Chelsea-Watseka association is poorly suited to onsite waste disposal. The soils in this association do not adequately filter the effluent. The poor filtering capacity may result in the pollution of ground water. An alternative waste disposal system is needed.

The associations range from well suited to unsuited to recreational development. The suitability depends partly on the intensity of the expected use. The Wea soils in the Wea-Comfrey association are well suited to intensive recreation uses (fig. 10). All the other associations generally are unsuited to recreational development. Wetness is the chief limitation. Other limitations are the clayey texture of the soils in the Rowe-Clarence and Bryce-Swygert associations and the sandy texture of the soils in the Gilford-Chelsea-Watseka association. At least some small areas of minor soils that are suited to recreational development generally are available in each association.

The major soils in the associations generally are moderately suited to wildlife habitat. Swygert, Lisbon, Elliott, Wea, Ridgeville, La Hogue, and Odell soils are well suited to openland and woodland wildlife habitat. Watseka, Martinton, and Clarence soils are well suited to woodland wildlife habitat. Rowe, Bryce, Milford, Ashkum, Comfrey, and Gilford soils are well suited to wetland wildlife habitat. Pella soils are well suited to openland and wetland wildlife habitat.

detailed soil map units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and management of the soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and identifies the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the substratum, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the substratum. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Elliott silty clay loam, 2 to 5 percent slopes, eroded, is one of several phases in the Elliott series.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. These dissimiliar soils are described in each map unit. Also, some of the more unusual or strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes some *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. A Dump is an example. Miscellaneous areas are too small to be delineated and are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

soil descriptions

27B—Miami silt loam, 1 to 5 percent slopes. This gently sloping, well drained soil is on convex slopes in the uplands. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is very dark grayish brown, very friable silt loam about 4 inches thick. The subsurface layer is dark brown, very friable silt loam about 5 inches thick. The subsoil is about 28 inches thick. The upper part is dark yellowish brown, friable loam; the next part is dark yellowish brown and yellowish brown, firm clay loam; and the lower part is brown, firm, calcareous loam. The substratum to a depth of 60 inches is brown, firm, calcareous loam. In some areas the surface layer is darker. In other areas the slope is less than 1 or more than 5 percent.

Included with this soil in mapping are small areas of the excessively drained Chelsea soils, the somewhat poorly drained Roby soils, and the poorly drained Selma soils. Chelsea soils are slightly higher on the landscape than the Miami soil. Also, their subsoil contains more sand. Roby soils are lower on the landscape than the Miami soil. Selma soils are in shallow depressions and drainageways and are subject to ponding. Included soils make up 5 to 15 percent of the unit.

Air and water move through the subsoil of the Miami soil at a moderate rate and through the substratum at a moderately slow rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content is low. The shrink-swell potential and the potential for frost action are moderate.

Most areas are used for pasture and hay. This soil is well suited to cultivated crops and to hay, pasture, and woodland. It is moderately well suited to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. It can be controlled, however, by terraces, contour farming, a system of conservation tillage that leaves crop residue on the surface after planting, or a combination of these. Returning crop residue to the soil or regularly adding other organic

material improves fertility and tilth and increases the rate of water intake.

Erosion can be held within tolerable limits by establishing pasture plants or hay on this soil. Timely deferment of grazing helps to prevent surface compaction and excessive runoff. If possible, pasture and hayland should be tilled on the contour when a seedbed is prepared.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Reinforcing foundations, however, helps to prevent the structural damage caused by shrinking and swelling. If the soil is used as a septic tank absorption field, the moderate or moderately slow permeability is a limitation. It can be overcome, however, by enlarging the absorption area.

The capability subclass is IIe.

49—Watseka loamy sand. This nearly level, somewhat poorly drained soil is on convex slopes and broad flats on outwash plains. Individual areas are irregular in shape and range from 3 to several hundred acres in size.

Typically, the surface layer is black, very friable loamy sand about 8 inches thick. The subsurface layer is very dark gray, mottled, very friable loamy fine sand about 6 inches thick. The subsoil is mottled fine sand about 23 inches thick. The upper part is dark yellowish brown and very friable, and the lower part is yellowish brown and loose. The substratum to a depth of 60 inches is mottled grayish brown, brown, and yellowish brown, loose fine sand. In some places the surface layer is lighter in color. In other places silty clay loam high in content of lime is within a depth of 50 inches. In some small areas the slope is more than 2 percent.

Included with this soil in mapping are small areas of the very poorly drained Granby soils and the excessively drained Sparta soils. Granby soils are in shallow depressions and drainageways and are subject to ponding. Sparta soils are higher on the landscape than the Watseka soil. Included soils make up 2 to 10 percent of the unit.

Air and water move through the Watseka soil at a rapid rate. Surface runoff is very slow in cultivated areas. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity is low. Organic matter content is moderate. The potential for frost action also is moderate.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops and to hay and pasture. It is poorly suited to dwellings and generally is unsuited to septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, soil blowing is a hazard and the low available water capacity a limitation. Field windbreaks and a cover of crop residue help to prevent excessive soil loss and the crop damage caused by windblown soil particles. Returning crop residue to the soil conserves moisture, helps to maintain tilth, and improves fertility.

If this soil is used as a site for dwellings or septic tank absorption fields, the seasonal high water table is a limitation. It can be lowered, however, by underground drains. The soil readily absorbs but does not adequately filter the effluent in septic tank absorption fields. The poor filtering capacity may result in the pollution of ground water. The septic tank system functions satisfactorily if a sealed sand filter and a disinfection tank are installed.

The capability subclass is IIIs.

59—Lisbon silt loam. This nearly level, somewhat poorly drained soil is on convex slopes and narrow flats in the uplands. Individual areas are irregular in shape and range from 3 to several hundred acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 11 inches thick. The subsoil is about 28 inches thick. It is mottled. The upper part is dark grayish brown, friable silt loam; the next part is grayish brown, friable silty clay loam; and the lower part is dark grayish brown and grayish brown, firm silty clay loam. The substratum to a depth of 60 inches is multicolored, firm, calcareous silt loam. In some places the surface layer is lighter in color as a result of erosion. In other places the upper part of the subsoil contains more sand. In some small areas the slope is more than 2 percent. In other small areas the depth to the seasonal high water table is more than 3 feet.

Included with this soil in mapping are small areas of the poorly drained Milford soils. These soils are in shallow depressions and drainageways and are subject to ponding. They make up 2 to 10 percent of the unit.

Air and water move through the subsoil of the Lisbon soil at a moderate rate and through the substratum at a moderately slow rate. Surface runoff is slow in cultivated areas. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, to pasture and hay, and to openland wildlife habitat. It is moderately well suited to lawns and ornamental trees and shrubs and is poorly suited to dwellings, septic tank absorption fields, and local roads and streets.

In the areas used for corn, soybeans, or small grain, a drainage system may be needed to improve productivity. Tile drains function satisfactorily if suitable outlets are available. Returning crop residue to the soil and keeping tillage at a minimum help to maintain fertility and tilth and help to prevent surface crusting.

If this soil is used as a site for dwellings, the seasonal high water table is a limitation. Also, the shrink-swell potential is a limitation on sites for dwellings without basements. Installing tile drains around the base of

foundations helps to lower the water table. Reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling. Installing a drainage system helps to establish lawns and ornamental trees and shrubs.

If this soil is used as a septic tank absorption field, the seasonal high water table and the moderately slow permeability are limitations. Underground drains help to lower the water table. Enlarging the absorption area helps to overcome the slow absorption of liquid waste.

The capability class is I.

69—Milford silty clay loam. This nearly level and depressional, poorly drained soil is in low lying areas on uplands. It is ponded for brief periods. Individual areas are irregular in shape and range from 3 to several hundred acres in size.

Typically, the surface layer is black, firm silty clay loam about 9 inches thick. The subsurface layer is black, firm silty clay about 9 inches thick. The subsoil is about 32 inches thick. It is mottled. The upper part is very dark gray, very firm silty clay; the next part is gray, very firm silty clay loam and clay loam; and the lower part is dark gray, firm silty clay loam stratified with thin layers of clay loam. The substratum to a depth of 60 inches is gray, mottled, firm clay loam stratified with fine sandy loam, silty clay loam, and silty clay. In some areas compact silty clay loam high in content of lime is within a depth of 40 inches. In some small areas the depth to the seasonal high water table is more than 1 foot. In places the subsoil contains less clay.

Air and water move through this soil at a moderately slow rate. Surface runoff is slow to ponded. The seasonal high water table is near or above the surface in the spring. Available water capacity is high. Organic matter content also is high. Tilling the soil is moderately difficult because of the high content of clay in the surface layer. The shrink-swell potential is moderate in the subsoil and substratum, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops and is moderately well suited to pasture and hay and to openland wildlife habitat. It is poorly suited to dwellings, lawns and ornamental trees and shrubs, local roads and streets, and septic tank absorption fields.

Because a drainage system has been installed, this soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain the drainage system are needed. Tile drains and surface drains function satisfactorily if suitable outlets are available. Keeping tillage at a minimum and returning crop residue to the soil help to improve tilth and maintain fertility.

If this soil is used as a site for dwellings, the ponding is a hazard and the shrink-swell potential a limitation. The ponding can be controlled by lowering the water table with underground drains and by installing surface drains. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Installing a drainage system helps to establish lawns and ornamental trees and shrubs.

If this soil is used as a septic tank absorption field, the ponding is a hazard and the moderately slow permeability a limitation. A drainage system is needed. Also, providing as much as 2 feet of loamy fill material is beneficial because it increases the depth to the seasonal high water table. Enlarging the absorption area helps to overcome the slow absorption of liquid waste.

The capability subclass is IIw.

88B—Sparta fine sand, 1 to 5 percent slopes. This gently sloping, excessively drained soil is on convex slopes on outwash plains, lake plains, and glacial till plains. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is very dark gray, very friable fine sand about 9 inches thick. The subsurface layer is very dark grayish brown, very friable loamy fine sand about 12 inches thick. The subsoil is dark yellowish brown, loose fine sand about 23 inches thick. The substratum to a depth of 60 inches is yellowish brown, loose fine sand. It has brown and yellowish brown fine sand iron bands. In places the surface layer is lighter in color as a result of erosion. In some areas the subsoil contains more clay. In other areas the slope is less than 1 or more than 5 percent.

Included with this soil in mapping are small areas of the somewhat poorly drained Ridgeville soils. These soils are lower on the landscape than the Sparta soil and have a seasonal high water table at a depth of 1 to 3 feet. They make up 2 to 10 percent of the unit.

Air and water move through the Sparta soil at a rapid rate. Surface runoff is slow in cultivated areas. Available water capacity is low. Organic matter content is moderately low. The subsoil ranges from strongly acid to slightly acid.

Most areas are used for cultivated crops. This soil is poorly suited to cultivated crops and is moderately suited to pasture, hay, and woodland. It is well suited to dwellings and generally is unsuited to septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, soil blowing is a hazard and the low available water capacity a limitation. Field windbreaks and a cover of crop residue help to prevent excessive soil loss and the crop damage caused by windblown soil particles. Returning crop residue to the soil conserves moisture, helps to maintain tilth, and improves fertility.

Pasture plants and hay can be grown on this soil. Overgrazing, however, reduces forage yields and causes surface compaction and excessive runoff and erosion. Pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

This soil readily absorbs but does not adequately filter the effluent in septic tank absorption fields. The poor filtering capacity may result in the pollution of ground water The septic tank system functions satisfactorily if a sealed sand filter and a disinfection tank are installed.

The capability subclass is IVs.

91A—Swygert silty clay loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on convex slopes and broad flats in the uplands. Individual areas are irregular in shape and range from 3 to several hundred acres in size.

Typically, the surface soil is black, friable silty clay loam about 12 inches thick. The subsoil is mottled silty clay about 39 inches thick. The upper part is very dark grayish brown and friable, the next part is dark brown and yellowish brown and is friable and firm, and the lower part is light olive brown, very firm, and calcareous. The substratum to a depth of 60 inches is brown, mottled, very firm, calcareous silty clay. In some places the surface layer is thinner as a result of erosion. In other places the depth to very firm silty clay high in content of lime is less than 20 inches. In some small areas the slope is more than 2 percent. In some areas the upper part of the subsoil contains less clay.

Included with this soil in mapping are small areas of the poorly drained Bryce soils. These soils are in shallow depressions and drainageways and are subject to ponding. They make up 2 to 10 percent of the unit.

Air and water move through the upper part of the subsoil in the Swygert soil at a slow rate and through the lower part of the soil at a very slow rate. Surface runoff is medium in cultivated areas. The seasonal high water table is at a depth of 2 to 4 feet. Available water capacity is moderate. Organic matter content is high. Tilling the soil is difficult because of the high content of clay in the surface layer. The shrink-swell potential and the potential for frost action are high.

Most areas are cultivated. This soil is well suited to cultivated crops, to pasture and hay, and to openland wildlife habitat. It is poorly suited to dwellings, septic tank absorption fields, and local roads and streets.

In the areas used for corn, soybeans, or small grain, the wetness is a limitation. A drainage system may be needed to improve productivity. Surface drains function satisfactorily if suitable outlets are available. Returning crop residue to the soil or regularly adding other organic material helps to maintain fertility, improves tilth, and increases the rate of water intake.

In the areas used for pasture, overgrazing reduces forage yields and causes surface compaction. Pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition. Unmowed strips, 30 to 50 feet wide, at the edge of hayland provide excellent nesting cover for openland wildlife.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Installing tile drains at the base of the foundation reduces the wetness.

If this soil is used as a septic tank absorption field, the seasonal high water table and the slow permeability are limitations. Underground drains help to lower the water table. Enlarging the absorption area helps to overcome the slow absorption of liquid waste.

The capability subclass is IIw.

91B—Swygert silty clay loam, 2 to 5 percent slopes. This gently sloping, somewhat poorly drained soil is on convex slopes in the uplands. Individual areas are irregular in shape and range from 3 to several hundred acres in size.

Typically, the surface layer is black, friable silty clay loam about 11 inches thick. The subsoil is silty clay about 34 inches thick. The upper part is very dark gray and friable; the next part is brown, mottled, and firm; and the lower part is brown, mottled, very firm, and calcareous. The substratum to a depth of 60 inches is brown, mottled, very firm, calcareous silty clay. In some places the surface layer is lighter in color as a result of erosion. In other places the depth to very firm silty clay high in content of lime is less than 20 inches. In some small areas the slope is less than 2 or more than 5 percent. In some areas the upper part of the subsoil contains less clay.

Included with this soil in mapping are small areas of the poorly drained Bryce soils. These soils are in shallow depressions and drainageways and are subject to ponding. They make up 2 to 10 percent of the unit.

Air and water move through the upper part of the subsoil in the Swygert soil at a slow rate and through the lower part of the soil at a very slow rate. Surface runoff is medium in cultivated areas. The seasonal high water table is at a depth of 2 to 4 feet. Available water capacity is moderate. Organic matter content is high. Tilling the soil is difficult because of the high content of clay in the surface layer. The shrink-swell potential and the potential for frost action are high.

Most areas are cultivated. This soil is well suited to cultivated crops, to pasture and hay, and to openland wildlife habitat. It is poorly suited to dwellings, septic tank absorption fields, and local roads and streets.

In the areas used for corn, soybeans, or small grain, erosion is a hazard and the wetness a limitation. Erosion can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting, contour farming, terraces, or a combination of these. A drainage system may be needed to improve productivity. Surface drains function satisfactorily if suitable outlets are available. Returning crop residue to the soil or regularly adding other organic material helps to maintain

fertility, improves tilth, and increases the rate of water intake.

In the areas used for pasture, overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion. Unmowed strips, 30 to 50 feet wide, at the edge of hayland provide excellent nesting cover for openland wildlife.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Installing tile drains at the base of the foundation reduces the wetness.

If this soil is used as a septic tank absorption field, the seasonal high water table and the slow permeability are limitations. Underground drains help to lower the water table. Enlarging the absorption area helps to overcome the slow absorption of liquid waste.

The capability subclass is IIe.

102—La Hogue loam. This nearly level, somewhat poorly drained soil is on convex slopes and broad flats on outwash plains. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is black, friable loam about 9 inches thick. The subsurface layer is very dark grayish brown, friable silt loam about 3 inches thick. The subsoil is about 34 inches thick. It is friable. The upper part is dark brown, mottled silty clay loam; the next part is yellowish brown and dark yellowish brown, mottled clay loam and loam; and the lower part is strong brown and mottled dark yellowish brown, dark grayish brown, and yellowish red loam and sandy loam. The substratum to a depth of 60 inches is mottled brownish yellow, dark yellowish brown, and dark grayish brown, friable loamy fine sand. In some small areas the slope is more than 2 percent. In some areas the lower part of the subsoil and the substratum are silt loam or silty clay loam high in content of lime. In other areas the depth to the seasonal high water table is more than 3 feet.

Included with this soil in mapping are small areas of the poorly drained Pella and Selma soils. These soils are in shallow depressions and drainageways and are subject to ponding. They make up 2 to 10 percent of the unit.

Air and water move through the subsoil of the La Hogue soil at a moderate rate and through the substratum at a moderately rapid rate. Surface runoff is slow in cultivated areas. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, to pasture and hay, and to openland wildlife habitat. It is moderately well suited to lawns and ornamental trees and shrubs and is poorly suited to dwellings, septic tank absorption fields, and local roads and streets.

In the areas used for corn, soybeans, or small grain, a drainage system may be needed to improve productivity. Tile drains function satisfactorily if suitable outlets are available. Keeping tillage at a minimum and returning crop residue to the soil or regularly adding other organic material help to maintain fertility and tilth.

If this soil is used as a site for dwellings or septic tank absorption fields, the seasonal high water table is a limitation. Also, the shrink-swell potential is a limitation on sites for dwellings without basements. Installing tile drains around foundations helps to lower the water table. Reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling. Installing a drainage system helps to establish lawns and ornamental trees and shrubs. Underground drains lower the water table in septic tank absorption fields.

The capability class is I.

103—Houghton muck. This nearly level and depressional, very poorly drained soil is in upland bogs. It is subject to ponding early in spring. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is black, highly decomposed muck about 9 inches thick. The subsoil to a depth of 60 inches is black and very dark gray muck. In some areas the layer of decomposed organic material is thinner. In other areas the subsoil contains more sand.

Included with this soil in mapping are some small areas where water ponds throughout most of the year. These areas make up 2 to 10 percent of the unit.

Air and water move through the Houghton soil at a moderate rate. Surface runoff is very slow or ponded in cultivated areas. The seasonal high water table is near or above the surface in winter and spring. Available water capacity and the potential for frost action are high. Organic matter content also is high. The soil is very unstable. It is highly compressible when supporting a heavy load and is subject to subsidence when drained.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops and to hay and pasture. It is poorly suited to woodland. It generally is unsuited to dwellings and septic tank absorption fields because of the ponding and the subsidence.

Because a drainage system has been installed in many areas, this soil commonly is sufficiently drained for corn, soybeans, and small grain. Measures that maintain the drainage system are needed. Surface drains function satisfactorily if suitable outlets are available. Tile drains do not function so well, however, because the soil is subject to subsidence. Keeping tillage at a minimum and

returning crop residue to the soil help to maintain tilth and fertility.

Pasture plants and hay can be grown on this soil. Overgrazing or grazing when the soil is too wet, however, reduces forage production and causes surface compaction and poor tilth. Proper stocking rates and timely deferment of grazing help to keep the pasture and the soil in good condition.

The capability subclass is IIIw.

107—Sawmill silty clay loam. This nearly level, poorly drained soil is on flood plains and in some drainageways that extend into the uplands. It is frequently flooded for brief periods from March to June. Individual areas are irregular in shape and range from 3 to several hundred acres in size.

Typically, the surface layer is black, firm silty clay loam about 9 inches thick. The subsurface layer is black, firm silty clay loam about 10 inches thick. The subsoil is firm silty clay loam about 39 inches thick. The upper part is very dark gray, and the lower part is olive gray and mottled. The substratum to a depth of 60 inches is olive gray, mottled, firm silty clay loam. In places the soil is dark to a depth of more than 36 inches. In some small areas the depth to the seasonal high water table is more than 2 feet.

Included with this soil in mapping are small areas of the slowly permeable Zook soils. These soils are slightly lower on the landscape than the Sawmill soil. They make up 2 to 10 percent of the unit.

Air and water move through the Sawmill soil at a moderate rate. Surface runoff is slow in cultivated areas. The seasonal high water table is within a depth of 2 feet. Available water capacity is high. Organic matter content also is high. Tilling the soil is moderately difficult because of the high content of clay in the surface layer. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to wetland wildlife habitat and is moderately well suited to cultivated crops and to pasture or hay. Because it is subject to flooding, it is poorly suited to local roads and streets and generally is unsuited to dwellings and septic tank absorption fields.

The areas used for corn, soybeans, or small grain are adequately protected from floodwater. The seasonal high water table is a limitation. Tile drains and surface drains are needed. Keeping tillage at a minimum and returning crop residue to the soil improves tilth and helps to maintain fertility.

If this soil is used for pasture and hay, a drainage system and measures that control flooding are needed. Overgrazing reduces forage yields and causes surface compaction and poor tilth. Restricted use during wet periods helps to keep the pasture and the soil in good condition.

This soil provides fair or good habitat for wetland wildlife. In most areas it is on both sides of the major streams, which provide habitat for game fish. Shallow water areas are available. Also available are grain and seed crops, wild herbaceous plants, wetland plants, and other important habitat elements.

The capability subclass is IIw.

125—Selma loam. This nearly level, poorly drained soil is in broad areas and narrow drainageways on outwash plains. It is ponded for brief periods early in spring. Individual areas are irregular in shape and range from 3 to several hundred acres in size.

Typically, the surface layer is black, friable loam about 9 inches thick. The subsurface layer is very dark gray, friable loam about 3 inches thick. The subsoil is about 32 inches thick. The upper part is dark gray and gray, mottled, friable loam; the next part is mottled gray and yellowish brown, friable loam; and the lower part is gray, mottled, very friable sandy loam. The substratum to a depth of 60 inches is gray, mottled, friable stratified silt loam and loamy sand. In places it is compact silty clay loam or silty clay high in content of lime. In some small areas the depth to the seasonal high water table is more than 2 feet. In small areas the dark surface soil is thicker.

Air and water move through the subsoil at a moderate rate and through the substratum at a moderately rapid rate. Surface runoff is very slow or ponded. The seasonal high water table is near or above the surface in the spring. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops and to habitat for openland wildlife and is moderately well suited to pasture and hay. It is poorly suited to dwellings and local roads and streets and generally is unsuited to septic tank absorption fields.

Because a drainage system has been installed, this soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain the drainage system are needed. Tile drains and surface drains function satisfactorily if suitable outlets are available. Keeping tillage at a minimum and returning crop residue to the soil help to maintain tilth and fertility.

If this soil is used as a site for dwellings or septic tank absorption fields, the ponding is a hazard. Also, the shrink-swell potential is a limitation on sites for dwellings without basements. The ponding on building sites can be controlled by lowering the water table with underground drains and by installing surface drains. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Surface and subsurface drains are needed in septic tank absorption fields. Providing as much as 2 feet of loamy material is beneficial because it increases the depth to the seasonal high water table.

The capability subclass is IIw.

131B—Alvin fine sandy loam, 1 to 5 percent slopes. This gently sloping, well drained soil is on convex slopes in the uplands. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is brown, very friable fine sandy loam about 8 inches thick. The subsoil is about 37 inches thick. It is friable. The upper part is brown fine sandy loam, and the lower part is yellowish brown fine sandy loam stratified with thin layers of loam. The substratum to a depth of 60 inches is brown, loose loamy sand. In places the surface layer is darker. In some small areas the slope is less than 1 or more than 5 percent.

Included with this soil in mapping are small areas of the somewhat poorly drained Roby soils and the excessively drained Chelsea soils. Roby soils are lower on the landscape than the Alvin soil and have a seasonal high water table at a depth of 1 to 3 feet. Chelsea soils are higher on the landscape than the Alvin soil. Also, their subsoil contains more sand. Included soils make up 5 to 10 percent of the unit.

Air and water move through the subsoil of the Alvin soil at a moderate rate and through the substratum at a moderately rapid rate. Surface runoff is slow in cultivated areas. Available water capacity is moderate. Organic matter content is low. The subsoil is medium acid or strongly acid. The potential for frost action is moderate.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to hay, pasture, woodland, dwellings, and septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, water erosion and soil blowing are hazards. They can be controlled, however, by terraces, contour farming, field windbreaks, or a system of conservation tillage that leaves crop residue on the surface after planting. The field windbreaks and protective cover of crop residue also help to prevent the crop damage caused by windblown soil particles.

If this soil is used for pasture, overgrazing reduces forage yields and causes surface compaction and excessive runoff and erosion. Pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

The capability subclass is IIe.

141A—Wesley fine sandy loam, 0 to 3 percent slopes. This nearly level, somewhat poorly drained soil is on convex slopes and narrow flats on outwash plains. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is black, friable fine sandy loam about 8 inches thick. The subsurface layer is black, friable fine sandy loam about 3 inches thick. The subsoil is about 30 inches thick. It is mottled. The upper part is dark grayish brown, friable and loose fine sandy loam; the next part is dark grayish brown and yellowish brown, loose loamy fine sand and fine sand; and the lower part is dark gray, firm, calcareous silty clay loam. The substratum to a depth of 60 inches is dark gray, mottled, firm, calcareous silty clay loam. In places the soil is deeper to calcareous silty clay loam. In some areas the upper part of the subsoil contains more clay. In some small areas the slope is more than 3 percent.

Included with this soil in mapping are small areas of the rapidly permeable Watseka soils in similar positions on the landscape. These soils contain less clay throughout than the Wesley soil. They make up 2 to 10 percent of the unit.

Air and water move through the upper part of the subsoil in the Wesley soil at a moderately rapid rate and through the lower part of the soil at a moderately slow rate. Surface runoff is slow in cultivated areas. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to hay and pasture. It is poorly suited to dwellings and septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, the seasonal high water table may delay planting and reduce productivity. Also, soil blowing is a hazard. Subsurface drains help to lower the water table. Field windbreaks and a cover of crop residue help to prevent excessive soil loss and the crop damage caused by windblown soil particles. Returning crop residue to the soil helps to maintain tilth and fertility.

If this soil is used as a site for dwellings or septic tank absorption fields, the seasonal high water table is a limitation. Also, the moderately slow permeability is a limitation in septic tank absorption fields. It can be overcome, however, by enlarging the absorption field. Underground drains help to lower the water table.

The capability subclass is IIIw.

145B2—Saybrook silt loam, 2 to 5 percent slopes, eroded. This gently sloping, moderately well drained soil is on convex slopes in the uplands. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 7 inches thick. The subsoil is about 25 inches thick. It is mottled. The upper part is yellowish brown, friable silt loam; the next part is yellowish brown, firm silty clay loam; and the lower part is light yellowish brown, firm, calcareous silt loam. The substratum to a depth of 60 inches is mottled light yellowish brown, yellowish brown, and light gray, firm, calcareous silt loam. In some areas the subsoil contains more sand. In some small areas the slope is less than 2 or more than 5 percent.

Included with this soil in mapping are small areas of the somewhat poorly drained Andres and Lisbon soils. These soils are lower on the landscape than the Saybrook soil and have a seasonal high water table at a depth of 1 to 3 feet. They make up 5 to 10 percent of the unit.

Air and water move through the Saybrook soil at a moderate rate. Surface runoff is medium in cultivated areas. The seasonal high water table is at a depth of 4 to 6 feet. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, to pasture and hay, to openland wildlife habitat, to lawns and ornamental trees and shrubs, and to dwellings. It is moderately suited to septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, further erosion is a hazard. It can be controlled, however, by a system of conservation tillage that leaves crop residue on the surface after planting, contour farming, terraces, or a combination of these.

If this soil is used as a site for dwellings with basements, the seasonal high water table is a limitation. It can be lowered, however, by installing tile lines around the base of foundations.

If this soil is used as a septic tank absorption field, the seasonal high water table and the moderate permeability are limitations. The septic system functions properly only if the water table is lowered or the distribution lines are installed closer to the surface than is typical. Enlarging the absorption area helps to overcome the slow absorption of liquid waste.

The capability subclass is IIe.

146A—Elliott loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on convex slopes in the uplands. Individual areas are irregular in shape and range from 3 to 160 acres in size.

Typically, the surface layer is very dark gray, friable loam about 9 inches thick. The subsurface layer is very dark gray, friable loam about 5 inches thick. The subsoil is about 24 inches thick. It is mottled. The upper part is dark brown, friable clay; the next part is brown, firm silty clay; and the lower part is yellowish brown, firm, calcareous silty clay loam. The substratum to a depth of 60 inches is yellowish brown, mottled, firm, calcareous silty clay loam. In some places the surface is lighter in color as a result of erosion. In other places the upper part of the subsoil contains less clay. In some small areas the depth to the seasonal high water table is more than 3 feet. In other small areas the slope is more than 2 percent.

Included with this soil in mapping are small areas of the poorly drained Ashkum soils. These soils are in shallow depressions and drainageways and are subject to ponding. They make up 2 to 10 percent of the unit.

Air and water move through the subsoil of the Elliott soil at a moderately slow rate and through the substratum at a slow rate. Surface runoff is medium in cultivated areas. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to hay and pasture. It is moderately well suited to lawns and ornamental trees and shrubs and is poorly suited to dwellings and septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, the seasonal high water table may delay planting and reduce productivity. It can be lowered, however, by subsurface drains. Returning crop residue to the soil helps to maintain tilth and fertility.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Underground drains help to lower the water table. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Installing a drainage system helps to establish lawns and ornamental trees and shrubs.

If this soil is used as a septic tank absorption field, the seasonal high water table and the moderately slow permeability are limitations. Underground drains lower the water table. Enlarging the absorption area helps to overcome the slow absorption of liquid waste.

The capability subclass is IIw.

146B—Elliott loam, 2 to 5 percent slopes. This gently sloping, somewhat poorly drained soil is on convex slopes in the uplands. Individual areas are irregular in shape and range from 3 to several hundred acres in size.

Typically, the surface layer is very dark gray, friable loam about 10 inches thick. The subsoil is mottled silty clay loam about 22 inches thick. The upper part is dark brown and friable, the next part is dark yellowish brown and firm, and the lower part is dark brown and yellowish brown, firm, and calcareous. The substratum to a depth of 60 inches is yellowish brown, mottled, firm, calcareous silty clay loam. In some places the surface layer is lighter in color as a result of erosion. In other places the upper part of the subsoil contains less clay. In some areas the depth to the seasonal high water table is more than 3 feet. In some small areas the slope is less than 2 or more than 5 percent.

Included with this soil in mapping are small areas of the poorly drained Ashkum soils. These soils are in shallow depressions and drainageways and are subject to ponding. They make up 2 to 10 percent of the unit.

Air and water move through the subsoil of the Elliott soil at a moderately slow rate and through the substratum at a slow rate. Surface runoff is medium in

cultivated areas. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, to pasture and hay, and to openland wildlife habitat. It is moderately well suited to lawns and ornamental trees and shrubs and is poorly suited to dwellings, septic tank absorption fields, and local roads and streets.

In the areas used for corn, soybeans, or small grain, erosion is a hazard and wetness a limitation. Erosion can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting, contour farming, terraces, or a combination of these. A drainage system may be needed to improve productivity. Tile drains function satisfactorily if suitable outlets are available.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Underground drains help to lower the water table. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Installing a drainage system helps to establish lawns and ornamental trees and shrubs.

If this soil is used as a septic tank absorption field, the seasonal high water table and the moderately slow permeability are limitations. Underground drains lower the water table. Enlarging the absorption area helps to overcome the slow absorption of liquid waste.

The capability subclass is IIe.

146B2—Elliott silty clay loam, 2 to 5 percent slopes, eroded. This gently sloping, somewhat poorly drained soil is on convex slopes in the uplands. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is very dark gray, friable silty clay loam about 6 inches thick. The subsoil is about 20 inches thick. It is mottled. The upper part is brown, firm silty clay, and the lower part is light olive brown, firm, calcareous silty clay loam. The substratum to a depth of 60 inches is light olive brown, mottled, firm, calcareous silty clay loam. In some places the surface layer is lighter in color as a result of erosion. In other places the upper part of the subsoil contains less clay. In some areas the depth to the seasonal high water table is more than 3 feet. In some small areas the slope is less than 2 or more than 5 percent.

Included with this soil in mapping are small areas of the moderately well drained Chatsworth soils. These soils are more sloping than the Elliott soil. They typically have a subsoil of firm and very firm, calcareous silty clay. They make up 2 to 10 percent of the unit.

Air and water move through the subsoil of the Elliott soil at a moderately slow rate and through the substratum at a slow rate. Surface runoff is medium in cultivated areas. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity is high. Organic matter content is moderate. Tilling the soil is moderately difficult because of the high content of clay in the surface layer. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops and is well suited to pasture and hay and to openland wildlife habitat. It is moderately well suited to lawns and ornamental trees and shrubs and is poorly suited to dwellings, septic tank absorption fields, and local roads and streets.

In the areas used for corn, soybeans, or small grain, further erosion is a hazard and wetness a limitation. Erosion can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting, contour farming, terraces, or a combination of these. A drainage system may be needed to improve productivity. Tile drains function satisfactorily if suitable outlets are available.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Underground drains help to lower the water table. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Installing a drainage system helps to establish lawns and ornamental trees and shrubs.

If this soil is used as a septic tank absorption field, the seasonal high water table and the moderately slow permeability are limitations. Underground drains lower the water table. Enlarging the absorption area helps to overcome the slow absorption of liquid waste.

The capability subclass is IIe.

147A—Clarence silty clay loam, 0 to 3 percent slopes. This nearly level, somewhat poorly drained soil is on convex slopes and broad flats in the uplands. Individual areas are irregular in shape and range from 3 to several hundred acres in size.

Typically, the surface layer is very dark gray, friable silty clay loam about 7 inches thick. The subsurface layer is very dark grayish brown, friable silty clay loam about 4 inches thick. The subsoil is about 28 inches thick. It is mottled. The upper part is dark grayish brown, firm silty clay; the next part is dark grayish brown, firm clay; and the lower part is grayish brown and dark grayish brown, firm and very firm, calcareous silty clay. The substratum to a depth of 60 inches is mottled dark grayish brown, light olive brown, and gray, very firm, calcareous silty clay. In some places the surface layer is thinner as a result of erosion. In other places the soil is deeper to very firm, calcareous silty clay. In some small areas the subsoil contains less clay. In other small areas the slope is more than 3 percent.

Included with this soil in mapping are small areas of the poorly drained Rowe soils. These soils are in shallow

depressions and drainageways and are subject to ponding. They make up 2 to 10 percent of the unit.

Air and water move through the Clarence soil at a very slow rate. Surface runoff is medium in cultivated areas. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity is low. Organic matter content is moderate. Tilling the soil is difficult because of the high content of clay in the surface layer. The shrink-swell potential and the potential for frost action are moderate.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops and to hay and pasture. It is poorly suited to dwellings and septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, the seasonal high water table may delay planting and reduce productivity. Also, the low available water capacity is a limitation. Open drainage ditches help to lower the water table. Returning crop residue to the soil conserves moisture and improves tilth and fertility.

If this soil is used as a site for dwellings or septic tank absorption fields, the seasonal high water table is a limitation. Also, the very slow permeability is a limitation in septic tank absorption fields. The septic tank system functions satisfactorily if a sealed sand filter and a disinfection tank are installed. The water table can be lowered by tile drains around the foundations of the dwellings.

The capability subclass is IIIw.

147B2—Clarence silty clay loam, 2 to 6 percent slopes, eroded. This gently sloping, somewhat poorly drained soil is on side slopes in the uplands. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is very dark gray, friable silty clay loam about 7 inches thick. The subsoil is dark grayish brown, mottled silty clay about 20 inches thick. The upper part is firm, and the lower part is very firm and calcareous. The substratum to a depth of 60 inches is dark grayish brown, mottled, very firm, calcareous silty clay. In some places the surface layer is lighter in color as a result of erosion. In other places it is darker. In some small areas the subsoil contains less clay. In other small areas the slope is less than 2 or more than 6 percent.

Included with this soil in mapping are small areas of the poorly drained Rowe soils. These soils are in shallow depressions and drainageways and are subject to ponding. They make up 2 to 10 percent of the unit.

Air and water move through the Clarence soil at a very slow rate. Surface runoff is rapid in cultivated areas. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity is low. Organic matter content is moderate. Tilling the soil is difficult because of the high content of clay in the surface layer. The shrink-swell potential and the potential for frost action are moderate.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops and to hay and pasture. It is poorly suited to dwellings and septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, the seasonal high water table may delay planting and reduce productivity. Also, erosion is a hazard and the low available water capacity a limitation. Open drainage ditches help to lower the water table. Terraces, contour farming, or a system of conservation tillage that leaves crop residue on the surface after planting helps to control erosion. Returning crop residue to the soil conserves moisture and improves tilth and fertility.

If this soil is used as a site for dwellings or septic tank absorption fields, the seasonal high water table is a limitation. Also, the very slow permeability is a limitation in septic tank absorption fields. The septic tank system functions satisfactorily if a sealed sand filter and a disinfection tank are installed. The water table can be lowered by tile drains around the foundations of the dwellings.

The capability subclass is IIIe.

150B—Onarga fine sandy loam, 1 to 5 percent slopes. This gently sloping, well drained soil is on convex slopes on outwash plains. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is very dark grayish brown, very friable fine sandy loam about 8 inches thick. The subsurface layer is very dark grayish brown, very friable fine sandy loam about 5 inches thick. The subsoil is about 20 inches thick. The upper part is dark yellowish brown, friable fine sandy loam; the next part is yellowish brown, very friable fine sandy loam; and the lower part is brownish yellow, very friable loamy fine sand. The substratum to a depth of 60 inches is mottled yellowish brown and light yellowish brown, loose fine sand and loamy fine sand. In some areas the surface layer is lighter in color as a result of erosion. In some small areas the slope is less than 1 or more than 5 percent.

Included with this soil in mapping are small areas of the somewhat poorly drained Ridgeville soils and the excessively drained Sparta soils. Ridgeville soils are lower on the landscape than the Onarga soil and have a seasonal high water table at a depth of 1 to 3 feet. Sparta soils are higher on the landscape than the Onarga soil. Also, their subsoil contains more sand. Included soils make up 2 to 10 percent of the unit.

Air and water move through the subsoil of the Onarga soil at a moderate rate and through the substratum at a rapid rate. Surface runoff is slow in cultivated areas. Available water capacity is moderate. Organic matter content also is moderate. The subsoil is very strongly acid to neutral. The potential for frost action is moderate.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to hay and pasture, dwellings, and septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, soil blowing is a hazard. Field windbreaks and a cover of crop residue help to prevent excessive soil loss and the crop damage caused by windblown soil particles.

The capability subclass is IIe.

151—Ridgeville fine sandy loam. This nearly level, somewhat drained soil is on convex slopes and broad flats on outwash plains. Individual areas are irregular in shape and range from 3 to 160 acres in size.

Typically, the surface layer is very dark brown, very friable fine sandy loam about 8 inches thick. The subsurface layer is very dark gray, very friable fine sandy loam about 8 inches thick. The subsoil is about 31 inches thick. It is mottled. The upper part is dark grayish brown, friable fine sandy loam; the next part is grayish brown, firm sandy clay loam and fine sandy loam; and the lower part is yellowish brown, very friable loamy fine sand. The substratum to a depth of 60 inches is light brownish gray, mottled, loose fine sand. In places the surface layer is lighter in color. In some small areas the subsoil contains more clay. In other small areas the slope is more than 2 percent. In some areas the depth to the seasonal high water table is more than 3 feet.

Included with this soil in mapping are small areas of the poorly drained Selma soils. These soils are in shallow depressions and drainageways and are subject to ponding. They make up 2 to 10 percent of the unit.

Air and water move through the upper part of the Ridgeville soil at a moderate rate and through the lower part at a rapid rate. Surface runoff is slow in cultivated areas. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity is moderate. Organic matter content also is moderate. The potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to hay and pasture. It is poorly suited to dwellings and septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, soil blowing and late summer drought are hazards. Field windbreaks and a cover of crop residue help to prevent excessive soil loss and the crop damage caused by windblown soil particles. Returning crop residue to the soil conserves moisture and helps to maintain tilth and fertility.

If this soil is used as a site for dwellings or septic tank absorption fields, the seasonal high water table is a limitation. Also, the soil readily absorbs but does not adequately filter the effluent in septic tank absorption fields. The poor filtering capacity may result in the pollution of ground water. The septic tank system functions satisfactorily if a sealed sand filter and a disinfection tank are installed. The water table can be lowered by tile drains around the foundations of the dwellings. Installing a drainage system helps to establish lawns and ornamental trees and shrubs.

The capability subclass is IIs.

153—Pella clay loam. This nearly level and depressional, poorly drained soil is in broad areas and drainageways on outwash plains and lake plains. It is ponded for brief periods early in spring. Individual areas are irregular in shape and range from 3 to several hundred acres in size.

Typically, the surface layer is black, firm clay loam about 6 inches thick. The subsurface layer is black, friable clay loam about 7 inches thick. The subsoil is about 25 inches thick. The upper part is very dark gray, firm clay loam; the next part is olive gray, mottled, firm clay loam and silty clay loam; and the lower part is gray, mottled, firm loam and silt loam. The substratum to a depth of 60 inches is gray and olive gray, mottled, firm, calcareous sandy loam, silt loam, and clay loam. In some places the depth to calcareous material is more than 40 inches. In other places the subsoil contains more sand. In some small areas the depth to the seasonal high water table is more than 2 feet. In other areas the dark surface soil is thicker.

Air and water move through this soil at a moderate rate. Surface runoff is slow to ponded. The seasonal high water table is near or above the surface in winter and spring. Available water capacity is high. Organic matter content also is high. Tilling the soil is moderately difficult because of the high content of clay in the surface layer. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops and to openland wildlife habitat and is moderately well suited to pasture and hay. It is poorly suited to dwellings, lawns and ornamental trees and shrubs, local roads and streets, and septic tank absorption fields.

Because a drainage system has been installed, this soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain the drainage system are needed. Tile drains function satisfactorily if suitable outlets are available. Keeping tillage at a minimum and returning crop residue to the soil improve tilth and help to maintain fertility.

If this soil is used as a site for dwellings, the ponding is a hazard. It can be controlled, however, by lowering the water table with underground drains and by installing surface drains. The shrink-swell potential is a limitation on sites for dwellings without basements. Reinforcing foundations, however, helps to prevent the structural damage caused by shrinking and swelling. Installing a drainage system helps to establish lawns and ornamental trees and shrubs.

If this soil is used as a septic tank absorption field, the ponding is a hazard. Surface and subsurface drains are needed. Also, providing as much as 2 feet of loamy fill material is beneficial because it increases the depth to the seasonal high water table.

The capability subclass is IIw.

178—Ruark fine sandy loam. This nearly level, poorly drained soil is on concave slopes and in depressions on outwash plains. It is ponded for brief periods early in spring (fig. 11). Individual areas are irregular in shape and range from 3 to 40 acres in size.

Typically, the surface layer is very dark grayish brown, friable fine sandy loam about 11 inches thick. The subsurface layer is grayish brown, mottled, friable fine sandy loam about 6 inches thick. The subsoil is about 33 inches thick. It is grayish brown, mottled, and friable. The upper part is fine sandy loam, the next part is sandy clay loam, and the lower part is fine sandy loam. The substratum to a depth of 60 inches is mottled yellowish brown and grayish brown, friable fine sandy loam. In some areas the surface layer is thicker and contains more organic matter.

Air and water move through this soil at a moderately slow rate. Surface runoff is slow to ponded in cultivated areas. The seasonal high water table is near or above the surface in the spring. Available water capacity is moderate. Organic matter content is moderately low. The subsoil is slightly acid to strongly acid. The surface layer is friable but tends to crust and puddle after hard rains. The potential for frost action is high.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops and to hay, pasture, and woodland. It is poorly suited to dwellings and septic tank absorption fields.

Because a drainage system has been installed, this soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain the drainage system are needed. Tile drains function satisfactorily if suitable outlets are available. Keeping tillage at a minimum and returning crop residue to the soil help to maintain tilth and fertility.

If this soil is used as a site for dwellings, the ponding is a hazard. It can be controlled, however, by lowering the water table with underground drains and by installing surface drains. The shrink-swell potential is a limitation on sites for dwellings without basements. Reinforcing foundations, however, helps to prevent the structural damage caused by shrinking and swelling. Installing a drainage system helps to establish lawns and ornamental trees and shrubs.

If this soil is used as a septic tank absorption field, the ponding is a hazard. Surface and subsurface drains are needed. Also, providing as much as 2 feet of loamy fill material is beneficial because it increases the depth to the seasonal high water table.

The capability subclass is IIIw.

Figure 11.—An area of Ruark fine sandy loam, which is subject to ponding.

184—Roby loamy fine sand. This nearly level, somewhat poorly drained soil is on convex slopes and narrow flats on outwash plains. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is dark grayish brown, very friable loamy fine sand about 8 inches thick. The subsurface layer is light yellowish brown, friable loamy fine sand about 3 inches thick. The subsoil is about 43 inches thick. It is yellowish brown and mottled. The upper part is friable fine sandy loam, and the lower part is loose loamy fine sand. The substratum to a depth of 60 inches is mottled dark yellowish brown and yellowish brown, friable loamy fine sand and fine sandy loam. In some places the surface layer is darker. In other places it is lighter in color as a result of erosion. In some small areas the subsoil contains less clay. In other small areas the slope is more than 2 percent. In some areas the depth to the seasonal high water table is more than 3 feet.

Included with this soil in mapping are small areas of the poorly drained Selma soils. These soils are in shallow depressions and drainageways and are subject to ponding. They make up about 2 to 10 percent of the unit.

Air and water move through the subsoil of the Roby soil at a moderate rate and through the substratum at a moderately rapid rate. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity is moderate. Organic matter content is moderately low. The potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to hay, pasture, and woodland. It is poorly suited to dwellings and septic absorption fields.

In the areas used for corn, soybeans, or small grain, soil blowing is a hazard and the moderate available water capacity a limitation. Field windbreaks and a cover of crop residue help to prevent excessive soil loss and the crop damage caused by windblown soil particles. Returning crop residue to the soil helps to maintain tilth, conserves moisture, and improves fertility.

If this soil is used as a site for dwellings or septic tank absorption fields, the seasonal high water table is a limitation. It can be lowered, however, by tile drains around the foundations of the dwellings and by underground drains in septic tank absorption fields. Installing a drainage system helps to establish lawns and ornamental trees and shrubs.

The capability subclass is IIs.

189A—Martinton silty clay loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on convex slopes and broad flats in the uplands. Individual areas are irregular in shape and range from 3 to 160 acres in size.

Typically, the surface layer is black, friable silty clay loam about 7 inches thick. The subsurface layer is black, friable silty clay loam about 10 inches thick. The subsoil is about 29 inches thick. It is mottled. The upper part is dark grayish brown, firm silty clay loam and silty clay; the next part is olive gray, firm silty clay loam; and the lower part is olive, friable silt loam. The substratum to a depth of 60 inches is mottled gray and yellowish brown, friable, calcareous silt loam and fine sandy loam. In places the surface layer is lighter in color as a result of erosion. In some small areas the upper part of the subsoil contains less clay. In other small areas the slope is more than 2 percent. In some areas very firm, calcareous silty clay is within a depth of 60 inches.

Included with this soil in mapping are small areas of the poorly drained Milford soils. These soils are in shallow depressions and drainageways and are subject to ponding. They make up 5 to 10 percent of the unit.

Air and water move through the Martinton soil at a moderately slow rate. Surface runoff is slow in cultivated areas. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to hay and pasture. It is poorly suited to dwellings and septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, the seasonal high water table delays planting in some years. It can be lowered, however, by subsurface drains. Returning crop residue to the soil helps to maintain tilth and fertility.

If this soil is used as a site for dwellings, the seasonal high water table is a limitation. It can be lowered, however, by underground drains. Installing a drainage system helps to establish lawns and ornamental trees and shrubs.

If this soil is used as a septic tank absorption field, the seasonal high water table and the moderately slow permeability are limitations. Underground drains lower the water table. Enlarging the absorption area helps to overcome the slow absorption of liquid waste.

The capability subclass is IIw.

189B—Martinton silt loam, 2 to 5 percent slopes. This gently sloping, somewhat poorly drained soil is on convex slopes in the uplands. Individual areas are irregular in shape and range from 3 to 160 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 10 inches thick. The subsurface layer is very dark gray, friable silty clay loam about 4 inches thick. The subsoil is about 36 inches thick. It is mottled. The upper part is brown, firm silty clay loam; the next part is dark yellowish brown, firm silty clay; and the lower part is brown, firm, calcareous silty clay loam and fine sandy loam. The substratum to a depth of 60 inches is brown, mottled, calcareous silty clay loam. In some places the surface layer is lighter in color as a result of erosion. In

other places the upper part of the subsoil contains less clay. In some areas the slope is less than 2 or more than 5 percent. In some small areas very firm, calcareous silty clay is within a depth of 60 inches.

Included with this soil in mapping are small areas of the poorly drained Milford soils. These soils are in shallow depressions and drainageways and are subject to ponding. They make up 5 to 10 percent of the unit.

Air and water move through the Martinton soil at a moderately slow rate. Surface runoff is medium in cultivated areas. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to hay and pasture. It is poorly suited to dwellings and septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, erosion is a hazard and wetness a limitation. Erosion can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting, contour farming, terraces, or a combination of these. A drainage system may be needed to improve productivity. Tile drains function satisfactorily if suitable outlets are available.

If this soil is used as a site for dwellings, the seasonal high water table is a limitation. It can be lowered, however, by underground drains. Installing a drainage system helps to establish lawns and ornamental trees and shrubs.

If this soil is used as a septic tank absorption field, the seasonal high water table and the moderately slow permeability are limitations. Underground drains lower the water table. Enlarging the absorption area helps to overcome the slow absorption of liquid waste.

The capability subclass is IIe.

189B2—Martinton silty clay loam, 2 to 5 percent slopes, eroded. This gently sloping, somewhat poorly drained soil is on side slopes in the uplands. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is very dark grayish brown, friable silty clay loam about 6 inches thick. The subsoil is mottled silty clay loam about 36 inches thick. The upper part is brown and friable, the next part is dark yellowish brown and firm, and the lower part is brown, firm, and calcareous. The substratum to a depth of 60 inches is brown, mottled, firm silty clay loam and silt loam. In some places the surface layer is lighter in color as a result of erosion. In other places the upper part of the subsoil contains less clay. In some small areas very firm, calcareous silty clay is within a depth of 60 inches. In some areas the slope is less than 2 or more than 5 percent.

Included with this soil in mapping are small areas of the moderately well drained Chatsworth soils. These soils are more sloping than the Martinton soil. They typically have a subsoil of very firm, calcareous silty clay. They make up 2 to 10 percent of the unit.

Air and water move through the Martinton soil at a moderately slow rate. Surface runoff is medium in cultivated areas. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity is high. Organic matter content is moderate. Tilling the soil is moderately difficult because of the high content of clay in the surface layer. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops and to hay and pasture. It is poorly suited to dwellings and septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, further erosion is a hazard. Also, the seasonal high water table delays planting in some years. It can be lowered, however, by subsurface drains. Erosion can be controlled by terraces, contour farming, or a system of conservation tillage that leaves crop residue on the surface after planting or by a combination of these. Returning crop residue to the soil improves tilth and fertility.

If this soil is used as a site for dwellings, the seasonal high water table is a limitation. It can be lowered, however, by underground drains. Installing a drainage system helps to establish lawns and ornamental trees and shrubs.

If this soil is used as a septic tank absorption field, the seasonal high water table and the moderately slow permeability are limitations. Underground drains lower the water table. Enlarging the absorption area helps to overcome the slow absorption of liquid waste.

The capability subclass is IIe.

192A—Del Rey silt loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on convex slopes and broad flats in the uplands. Individual areas are irregular in shape and range from 3 to 160 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 4 inches thick. The subsurface layer is light brownish gray, friable silt loam about 5 inches thick. The subsoil is about 32 inches thick. It is firm. The upper part is brown silty clay loam; the next part is light brownish gray, mottled silty clay; and the lower part is mottled light olive brown, light brownish gray, and light gray silty clay and silty clay loam. The substratum to a depth of 60 inches is mottled grayish brown and yellowish brown, friable, calcareous silty clay loam. In some areas the surface layer is darker. In other areas the upper part of the subsoil contains less clay. In some small areas the slope is more than 2 percent.

Included with this soil in mapping are small areas of the poorly drained Milford and Monee soils. These soils are in shallow depressions and drainageways and are subject to ponding. They make up 2 to 10 percent of the unit.

Air and water move through the Del Rey soil at a slow rate. Surface runoff is slow in cultivated areas. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity is high. Organic matter content is moderate. The surface soil is friable but tends to crust and puddle after hard rains. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to hay and pasture. It is moderately suited to woodland. It is poorly suited to dwellings and septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, the seasonal high water table delays planting in some years. It can be lowered, however, by open drainage ditches. Returning crop residue to the soil helps to prevent surface crusting and improves tilth and fertility.

If this soil is used as a site for dwellings or septic tank absorption fields, the seasonal high water table is a limitation. Also, the slow permeability is a limitation in septic tank absorption fields. The water table can be lowered by tile drains around the foundations of the dwellings and by underground drains in septic tank absorption fields. Enlarging the absorption area helps to overcome the slow absorption of liquid waste.

The capability subclass is IIw.

192B2—Del Rey silty clay loam, 2 to 7 percent slopes, eroded. This gently sloping, somewhat poorly drained soil is on side slopes in the uplands. Individual areas are irregular in shape and range from 3 to 40 acres in size.

Typically, the surface layer is light yellowish brown, firm silty clay loam about 8 inches thick. The subsoil is about 11 inches thick. It is mottled and firm. The upper part is dark yellowish brown silty clay loam, and the lower part is yellowish brown, calcareous silt loam and silty clay loam. The substratum to a depth of 60 inches is mottled gray and olive yellow, friable, calcareous silty clay loam, fine sandy loam, and silt loam. In some places the surface layer is darker. In other places the upper part of the subsoil contains less clay. In some areas the depth to the seasonal high water table is more than 3 feet. In other areas the slope is less than 2 or more than 7 percent.

Included with this soil in mapping are small areas of the moderately well drained Chatsworth soils on the more sloping parts of the landscape. These soils typically have a subsoil of firm and very firm, calcareous silty clay. They make up 2 to 10 percent of the unit.

Air and water move through the Del Rey soil at a slow rate. Surface runoff is rapid in cultivated areas. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity is high. Organic matter content is low. Tilling the soil is moderately difficult because of the high content of clay in the surface layer. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops and to hay, pasture, and woodland. It is poorly suited to dwellings and septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, erosion is a hazard. Also, the seasonal high water table delays planting in some years. It can be lowered, however, by open drainage ditches. Erosion can be controlled by terraces, contour farming, or a system of conservation tillage that leaves crop residue on the surface after planting or by a combination of these. Returning crop residue to the soil improves tilth and fertility.

If this soil is used as a site for dwellings or septic tank absorption fields, the seasonal high water table is a limitation. Also, the slow permeability is a limitation in septic tank absorption fields. The water table can be lowered by tile drains around the foundations of the dwellings and by underground drains in septic tank absorption fields. Enlarging the absorption area helps to overcome the slow absorption of liquid waste.

The capability subclass is IIe.

201—Gilford very fine sandy loam. This nearly level, very poorly drained soil is on concave slopes and in depressions on outwash plains. It is ponded for brief periods early in spring. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is black, very friable very fine sandy loam about 9 inches thick. The subsurface layer is black, very friable very fine sandy loam about 6 inches thick. The subsoil is very fine sandy loam about 22 inches thick. The upper part is very dark gray and friable, and the lower part is dark grayish brown and grayish brown and is friable and very friable. The substratum to a depth of 60 inches is grayish brown and dark gray, mottled, loose loamy fine sand and fine sand. In some areas the subsoil contains more clay.

Included with this soil in mapping are small areas of the organic Aurelius and Houghton soils. These soils are lower on the landscape than the Gilford soil. They make up 2 to 10 percent of the unit.

Air and water move through the subsoil of the Gilford soil at a moderately rapid rate and through the substratum at a rapid rate. Surface runoff is very slow or ponded in cultivated areas. The seasonal high water table is near or above the surface in winter and spring. Available water capacity is moderate. Organic matter content is high. The potential for frost action also is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to hay and pasture. It

is poorly suited to woodland and to dwellings and generally is unsuited to septic tank absorption fields.

Because a drainage system has been installed, this soil is sufficiently drained for corn, soybeans, and small grain. The ponding, however, damages crops and delays planting. Also, soil blowing is a hazard. Field windbreaks and a cover of crop residue help to prevent excessive soil loss and the damage caused by windblown soil particles. Measures that maintain or improve the drainage system are needed in some areas. Surface drains help to control the ponding. Returning crop residue to the soil helps to maintain tilth and fertility.

If this soil is used as a site for dwellings or septic tank absorption fields, the ponding is a hazard. It can be controlled, however, by installing surface drains and by lowering the water table with underground drains around footings. The soil readily absorbs but does not adequately filter the effluent in septic tank absorption fields. The poor filtering capacity may result in the pollution of ground water. The septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank are installed.

The capability subclass is IIw.

223B—Varna loam, 1 to 5 percent slopes. This gently sloping, moderately well drained soil is on convex slopes in the uplands. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is very dark grayish brown, friable loam about 10 inches thick. The subsoil is about 34 inches thick. The upper part is yellowish brown, friable silty clay; the next part is dark yellowish brown and dark brown, mottled, firm silty clay; and the lower part is brown and dark brown, mottled, firm, calcareous silty clay loam. The substratum to a depth of 60 inches is dark brown, mottled, firm, calcareous silty clay loam. In some places the surface layer is thinner. In other places it is lighter in color as a result of erosion. In some areas the upper part of the subsoil contains less clay. In some small areas the slope is less than 1 or more than 5 percent.

Included with this soil in mapping are small areas of the somewhat poorly drained Andres and Elliott soils. These soils are lower on the landscape than the Varna soil and have a seasonal high water table at a depth of 1 to 3 feet. They make up 5 to 10 percent of the unit.

Air and water move through the Varna soil at a moderately slow rate. Surface runoff is medium in cultivated areas. The seasonal high water table is at a depth of 3 to 6 feet. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops and to pasture and hay, openland wildlife habitat, and lawns and landscaping. It is moderately well suited to dwellings and is poorly suited to septic tank absorption fields and local roads and streets.

In the areas used for corn, soybeans, or small grain, erosion is a hazard. It can be controlled, however, by contour farming, terraces, or a system of conservation tillage that leaves crop residue on the surface after planting.

If this soil is used as a site for dwellings with basements, the seasonal high water table is a limitation. It can be lowered, however, by installing tile lines around the base of foundations. If the soil is used as a site for dwellings without basements, the shrink-swell potential is a limitation. Reinforcing foundations, however, helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a septic tank absorption field, the seasonal high water table and the moderately slow permeability are limitations. Underground drains help to lower the water table. Enlarging the absorption area helps to overcome the slow absorption of liquid waste.

The capability subclass is IIe.

228B—Nappanee silt loam, 1 to 6 percent slopes. This gently sloping, somewhat poorly drained soil is on convex slopes in the uplands. Individual areas are irregular in shape and range from 3 to 160 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 4 inches thick. The subsurface layer is brown, friable silt loam about 4 inches thick. The subsoil is about 24 inches thick. The upper part is brown, firm silty clay loam, and the lower part is grayish brown, mottled, very firm silty clay. The substratum to a depth of 60 inches is mottled grayish brown, gray, and yellowish brown, very firm, calcareous silty clay. In some places the surface layer is darker. In other places it is thinner as a result of erosion. In some small areas the slope is less than 1 or more than 6 percent.

Included with this soil in mapping are small areas of the poorly drained Monee and Rowe soils. These soils are in shallow depressions and drainageways and are subject to ponding. They make up 2 to 10 percent of the unit.

Air and water move through the Nappanee soil at a very slow rate. Surface runoff is slow in cultivated areas. The seasonal high water table is at a depth of 1 to 2 feet. Available water capacity is low. Organic matter content is moderately low. The subsoil is strongly acid to neutral. The surface layer is friable but tends to crust and puddle after hard rains. The shrink-swell potential and the potential for frost action are moderate.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops and to hay, pasture, and woodland. It is poorly suited to dwellings and septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, erosion is a hazard. Also, the seasonal high water table delays planting and reduces productivity in some years.

It can be lowered, however, by open drainage ditches. Erosion can be controlled by terraces, contour farming, or a system of conservation tillage that leaves crop residue on the surface after planting. Returning crop residue to the soil helps to prevent surface crusting and improves tilth.

If this soil is used as a site for dwellings, the shrink-swell potential and the seasonal high water table are limitations. Reinforcing foundations helps to prevent the damage caused by shrinking and swelling. Underground drains help to lower the water table.

If this soil is used as a septic tank absorption field, the very slow permeability and the seasonal high water table are limitations. Underground drains help to lower the water table. The septic tank system can function satisfactorily if a sealed sand filter and a disinfection tank are installed.

The capability subclass is IIIe.

229—Monee silty clay loam. This nearly level and depressional, poorly drained soil is on concave slopes and in depressions on uplands. It is ponded for brief periods. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is very dark gray, friable silty clay loam about 8 inches thick. The subsurface layer is dark grayish brown and grayish brown, friable silty clay loam about 6 inches thick. The subsoil is about 42 inches thick. It is mottled. The upper part is dark gray and dark grayish brown, firm silty clay loam; the next part is grayish brown, very firm silty clay; and the lower part is olive gray, very firm silty clay. The substratum to a depth of 60 inches is gray and olive gray, mottled, very firm silty clay. In some areas the surface layer is darker. In other areas it is thicker. In some places the depth to the seasonal high water table is more than 1 foot.

Air and water move through this soil at a very slow rate. Surface runoff is slow to ponded. The seasonal high water table is near or above the surface in winter and spring. Available water capacity is moderate. Organic matter content also is moderate. Tilling the soil is moderately difficult because of the high content of clay in the surface layer. The shrink-swell potential is high, and the potential for frost action is moderate.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops and to hay and pasture. It is poorly suited to dwellings without basements and generally is unsuited to dwellings with basements and to septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, the seasonal high water table and the ponding may delay planting or drown out crops. Open drainage ditches and surface inlet tile drains, however, can help to overcome these limitations if suitable outlets are available. Returning crop residue to the soil helps to prevent surface crusting, improves tilth, and helps to maintain fertility.

If this soil is used as a site for dwellings without basements, the shrink-swell potential is a limitation and the ponding a hazard. They can be overcome by providing a layer of suitable soil material, so that the foundation is above the water table and the part of the soil that has a high shrink-swell potential. The water table can be lowered by installing underground drains in coarse grained material around footings.

If this soil is used as a septic tank absorption field, the ponding is a hazard and the very slow permeability a limitation. The septic tank system can function satisfactorily only if the water table is lowered and a sealed sand filter and a disinfection tank are installed.

The capability subclass is IIIw.

230—Rowe silty clay loam. This nearly level and depressional, poorly drained soil is in low lying areas on uplands. It is occasionally ponded for brief periods throughout the year. Individual areas are irregular in shape and range from 3 to several hundred acres in size.

Typically, the surface layer is very dark grayish brown, friable silty clay loam about 7 inches thick. The subsurface layer also is very dark grayish brown, friable silty clay loam about 7 inches thick. The subsoil is about 34 inches thick. It is grayish brown and mottled. The upper part is friable silty clay, the next part is firm clay, and the lower part is firm and very firm silty clay. The substratum to a depth of 60 inches is mottled yellowish brown, gray, and dark grayish brown, very firm calcareous silty clay. In some areas the subsoil contains less clay. In other areas the depth to the seasonal high water table is more than 1 foot. In some small areas the dark surface soil is thicker.

Air and water move through this soil at a very slow rate. Surface runoff is slow to ponded. The seasonal high water table is near or above the surface in the spring. Available water capacity is moderate. Organic matter content is high. Tilling the soil is difficult because of the high content of clay in the surface layer. The shrink-swell potential is high, and the potential for frost action is moderate.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops and to hay and pasture. It is poorly suited to dwellings without basements and generally is unsuited to dwellings with basements and to septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, the seasonal high water table and the ponding delay planting, damage crops, and reduce productivity. Open drainage ditches help to lower the water table. Surface drains help to control ponding. Returning crop residue to the soil conserves moisture, improves tilth, and helps to maintain fertility.

If this soil is used as a site for dwellings without basements, the shrink-swell potential is a limitation and the ponding a hazard. They can be overcome by

providing a layer of suitable soil material, so that the foundation is above the water table and the part of the soil that has a high shrink-swell potential. The water table can be lowered by installing underground drains in coarse grained material around footings.

If this soil is used as a septic tank absorption field, the ponding is a hazard and the very slow permeability a limitation. The septic tank system can function satisfactorily only if the water table is lowered and a sealed sand filter and a disinfection tank are installed.

The capability subclass is IIIw.

232—Ashkum silty clay loam. This nearly level, poorly drained soil is on foot slopes on the lower parts of uplands and along upland drainageways. It is ponded for brief periods early in spring. Individual areas are irregular in shape and range from 3 to several hundred acres in size.

Typically, the surface layer is black, friable silty clay loam about 12 inches thick. The subsoil is mottled silty clay loam about 38 inches thick. The upper part is grayish brown and firm, the next part is olive and firm, and the lower part is gray and very firm. The substratum to a depth of 60 inches is gray, mottled, very firm silty clay loam. In some areas the subsoil contains more clay. In some small areas it contains less clay and more sand.

Air and water move through this soil at a moderately slow rate. Surface runoff is slow to ponded. The seasonal high water table is near or above the surface in the spring. Available water capacity is high. Organic matter content also is high. Tilling the soil is moderately difficult because of the high content of clay in the surface layer. The shrink-swell potential and the potential for frost action are high.

Most areas are cultivated. This soil is well suited to cultivated crops and is moderately well suited to pasture and hay and to openland wildlife habitat. It is poorly suited to dwellings, lawns and ornamental trees and shrubs, local roads and streets, and septic tank absorption fields.

Because a drainage system has been installed, this soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain the drainage system are needed. Tile drains and surface drains function satisfactorily if suitable outlets are available. Keeping tillage at a minimum and returning crop residue to the soil improve tilth and help to maintain fertility.

If this soil is used as a site for dwellings, the ponding is a hazard and the shrink-swell potential a limitation. The ponding can be controlled by lowering the water table with underground drains and by installing surface drains. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Installing a drainage system helps to establish lawns and ornamental trees and shrubs.

If this soil is used as a septic tank absorption field, the ponding is a hazard and the moderately slow permeability a limitation. A drainage system is needed. Also, providing as much as 2 feet of loamy fill material is beneficial because it increases the depth to the seasonal high water table. Enlarging the absorption area helps to overcome the slow absorption of liquid waste.

The capability subclass is IIw.

235—Bryce silty clay. This nearly level and depressional, poorly drained soil is in low lying areas on uplands. It is ponded for brief periods early in spring. Individual areas are irregular in shape and range from 3 to several hundred acres in size.

Typically, the surface layer is black, friable silty clay about 13 inches thick. The subsoil to a depth of 60 inches is mottled silty clay. The upper part is black and friable, the next part is dark grayish brown, olive gray, and gray and is firm, and the lower part is gray, very firm, and calcareous. In some areas the subsoil contains less clay. In some small areas the dark surface soil is thicker. In places the depth to the seasonal high water table is more than 1 foot.

Air and water move through this soil at a slow rate. Surface runoff is slow to ponded. The seasonal high water table is near or above the surface in winter and spring. Available water capacity is moderate. Organic matter content is high. Tilling the soil is difficult because of the high content of clay in the surface layer. The shrink-swell potential and the potential for frost action are high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to hay and pasture. It is poorly suited to dwellings without basements and generally is unsuited to dwellings with basements and to septic tank absorption fields because of the ponding, the shrink-swell potential, and the slow permeability.

Because a drainage system has been installed, this soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain or improve the drainage system are needed. Surface drains function satisfactorily if suitable outlets are available. Keeping tillage at a minimum and returning crop residue to the soil improve tilth and help to maintain fertility.

Pasture plants and hay can be grown on this soil. Surface inlet tile lines or shallow ditches help to remove ponded water. Overgrazing or grazing when the soil is too wet causes surface compaction and poor tilth. Proper stocking rates, pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture and the soil in good condition.

If this soil is used as a site for dwellings, the ponding is a hazard and the shrink-swell potential a limitation. The ponding can be controlled by lowering the water table with underground drains and by installing surface drains. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. A drainage system helps to establish lawns and ornamental trees and shrubs.

The capability subclass is IIw.

238—Rantoul silty clay. This nearly level and depressional, very poorly drained soil is on concave slopes and in depressions in the uplands. It is ponded for brief periods. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is black, firm silty clay about 9 inches thick. The subsurface layer is black, firm silty clay about 13 inches thick. The subsoil to a depth of 60 inches is silty clay. The upper part is very dark gray and very firm, and the lower part is gray, mottled, and very firm and firm. In some areas the dark surface soil is thinner. In other areas the subsoil contains less clay.

Air and water move through this soil at a very slow rate. Surface runoff is very slow or ponded. The seasonal high water table is near or above the surface in the spring. Available water capacity is moderate. Organic matter content is high. Tillin the soil is difficult because of the high content of clay in the surface layer. The shrink-swell potential is high, and the potential for frost action is moderate.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops and to hay and pasture. It is poorly suited to dwellings without basements and generally is unsuited to dwellings with basements and to septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, the seasonal high water table and the ponding delay planting, damage crops, and reduce productivity (fig. 12). Open drainage ditches help to lower the water table. Surface drains help to control the ponding. Returning crop residue to the soil improves tilth and fertility.

If this soil is used as a site for dwellings without basements, the shrink-swell potential is a limitation and the ponding a hazard. They can be overcome by providing a layer of suitable soil material, so that the foundation is above the water table. The water table can be lowered by installing underground drains in coarse grained material around footings. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a septic tank absorption field, the ponding is a hazard and the very slow permeability a limitation. The septic tank system can function satisfactorily only if the water table is lowered and a sealed sand filter and a disinfection tank are installed.

The capability subclass is IIIw.

241C—Chatsworth silty clay, 4 to 10 percent slopes. This moderately sloping, moderately well drained soil is on severely eroded side slopes in the uplands. Individual areas are irregular in shape and range from 3 to 160 acres in size.

Figure 12.—An area of Rantoul silty clay where a crop has been damaged because of ponding in the spring.

Typically, the surface layer is dark grayish brown, firm, calcareous silty clay about 2 inches thick. The subsoil is mottled, calcareous silty clay about 20 inches thick. The upper part is dark grayish brown and firm and very firm, and the lower part is grayish brown and very firm. The substratum to a depth of 60 inches is dark grayish brown and dark gray, mottled, very firm, calcareous silty clay. In some places the surface layer is thicker. In other places it is darker. In some small areas the depth to the seasonal high water table is less than 6 feet. In other small areas the slope is less than 4 or more than 10 percent.

Air and water move through this soil at a very slow rate. As a result, the surface layer and the upper part of the subsoil are nearly saturated in winter and early in spring. Surface runoff is rapid in cultivated areas. Available water capacity is low. Organic matter content also is low. Tilling the soil is difficult because of the high content of clay in the surface layer. The shrink-swell potential and the potential for frost action are moderate.

Most areas are used for pasture and hay. This soil generally is unsuited to cultivated crops because it is subject to erosion. It is poorly suited to pasture and hay. It is moderately suited to dwellings and is poorly suited to septic tank absorption fields.

Establishing pasture plants or hay on this soil helps to keep erosion within tolerable limits. Timely deferment of grazing helps to prevent surface compaction and excessive runoff. If possible, the pasture should be tilled on the contour when a seedbed is prepared.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Reinforcing foundations, however, helps to prevent the structural damage caused by shrinking and swelling. If the soil is used as a septic tank absorption field, the very slow permeability is a limitation. Enlarging the absorption area, however, helps to overcome the slow absorption of liquid waste. Installing the filter lines on the contour helps to evenly distribute the liquid waste.

The capability subclass is VIe.

241D—Chatsworth silty clay, 10 to 20 percent slopes. This strongly sloping, moderately well drained soil is on severely eroded side slopes in the uplands. Individual areas are irregular in shape and range from 3 to 40 acres in size.

Typically, the surface layer is very dark grayish brown, firm silty clay about 7 inches thick. The subsoil is firm silty clay about 22 inches thick. The upper part is dark gray, and the lower part is olive gray, mottled, and calcareous. The substratum to a depth of 60 inches is olive gray, mottled, firm, calcareous silty clay. In some places the surface layer is thinner. In other places it is darker. In some areas the depth to the seasonal high water table is less than 6 feet. In some small areas the slope is less than 10 or more than 20 percent.

Air and water move through this soil at a very slow rate. Surface runoff is rapid in cultivated areas. Available water capacity is low. Organic matter content also is low. Tilling the soil is difficult because of the high content of clay in the surface layer. The shrink-swell potential and the potential for frost action are moderate.

Most areas are used for pasture or hay. This soil generally is unsuited to cultivated crops because it is subject to erosion. It is poorly suited to pasture and hay and to dwellings and septic tank absorption fields.

Establishing pasture plants or hay on this soil helps to keep erosion within tolerable limits. Timely deferment of grazing helps to prevent surface compaction and excessive runoff. If possible, the pasture should be tilled on the contour when a seedbed is prepared.

If this soil is used as a site for dwellings, the shrink-swell potential and the slope are limitations. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Cutting and filling help to overcome the slope.

If this soil is used as a septic tank absorption field, the slope and the very slow permeability are limitations. Enlarging the absorption area helps to overcome the slow absorption of liquid waste. Installing the filter lines on the contour helps to overcome the slope.

The capability subclass is VIIe.

284—Tice silt loam. This nearly level, somewhat poorly drained soil is on flood plains and in some drainageways that extend into the uplands. It is frequently flooded for brief periods early in spring. Individual areas are irregular in shape and range from 3 to 180 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 8 inches thick. The subsurface layer is very dark grayish brown, friable silty clay loam about 4 inches thick. The subsoil to a depth of more than 60 inches is mottled silty clay loam. The upper part is dark brown and dark yellowish brown and is firm, and the lower part is dark brown and friable. In places the surface layer is thinner. In some small areas the slope is more than 2 percent.

Included with this soil in mapping are small areas of the poorly drained Comfrey and Sawmill soils in shallow depressions and drainageways. These soils make up 5 to 10 percent of the unit.

Air and water move through the Tice soil at a moderate rate. Surface runoff is slow in cultivated areas. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to pasture and hay. It generally is unsuited to dwellings and septic tank absorption fields because of the flooding.

In the areas used for corn, soybeans, or small grain, the seasonal high water table delays planting in some years. Also, the floodwater occasionally delays planting and damages crops. Subsurface drains help to lower the water table. Dikes help to control the floodwater. Returning crop residue to the soil helps to maintain tilth and fertility.

In the areas used for pasture, overgrazing reduces forage yields and causes surface compaction. Pasture rotation, deferment of grazing until the grasses reach a minimum grazing height, and applications of fertilizer help to keep the pasture and the soil in good condition.

The capability subclass is IIIw.

293—Andres loam. This nearly level, somewhat poorly drained soil is on convex slopes and narrow flats in the uplands. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is very dark gray, friable loam about 11 inches thick. The subsoil is about 28 inches thick. It is mottled. The upper part is dark brown and dark yellowish brown, friable silty clay loam and clay loam, and the lower part is brown and dark yellowish brown, firm, calcareous silty clay loam. The substratum to a depth of 60 inches is brown, mottled, firm, calcareous silty clay loam. In places the soil is deeper to calcareous silty clay loam or silt loam. In some small areas the slope is more than 2 percent.

Air and water move through the subsoil at a moderate rate and through the substratum at a moderately slow rate. Surface runoff is slow in cultivated areas. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to hay and pasture. It is poorly suited to dwellings and septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, the seasonal high water table delays planting in some years. It can be lowered, however, by subsurface drains. Returning crop residue to the soil helps to maintain tilth and fertility.

If this soil is used as a site for dwellings, the seasonal high water table is a limitation. It can be lowered, however, by installing tile drains around the base of foundations. Installing a drainage system helps to establish lawns and ornamental trees and shrubs.

If this soil is used as a septic tank absorption field, the seasonal high water table and the moderately slow permeability are limitations. Underground drains help to lower the water table. Enlarging the absorption area helps to overcome the slow absorption of liquid waste.

The capability class is I.

294B—Symerton silt loam, 1 to 5 percent slopes. This gently sloping, moderately well drained soil is on convex slopes in the uplands. Individual areas are irregular in shape and range from 3 to 40 acres in size.

Typically, the surface layer is black, firm silt loam about 10 inches thick. The subsurface layer is about 9 inches of very dark gray and very dark grayish brown, friable silt loam and silty clay loam. The subsoil is about 20 inches thick. It is firm. The upper part is dark brown gravelly clay loam; the next part is yellowish brown, mottled gravelly loam; and the lower part is brown, mottled, calcareous silt loam. The substratum to a depth of 60 inches is light olive brown and light yellowish brown, mottled, firm, calcareous silt loam. In some places the surface layer is lighter in color as a result of erosion. In other places the upper part of the subsoil contains more clay. In some areas the slope is less than 1 or more than 5 percent.

Included with this soil in mapping are small areas of the somewhat poorly drained Elliott and Lisbon soils. These soils are lower on the landscape than the Symerton soil and have a seasonal high water table at a depth of 1 to 3 feet. They make up 5 to 10 percent of the unit.

Air and water move through the subsoil of the Symerton soil at a moderate rate and through the substratum at a moderately slow rate. Surface runoff is medium in cultivated areas. The seasonal high water table is at a depth of 3.5 to 6.0 feet. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential and the potential for frost action also are moderate.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to hay and pasture. It is moderately suited to dwellings and is poorly suited to septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, erosion is a hazard. It can be controlled, however, by terraces, contour farming, or a system of conservation tillage that leaves crop residue on the surface after planting.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Also, the seasonal high water table is a limitation on sites for dwellings with basements. It can be lowered, however, by underground drains around footings. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a septic tank absorption field, the moderately slow permeability and the seasonal high water table are limitations. Underground drains help to lower the water table. Enlarging the absorption area helps to overcome the slow absorption of liquid waste.

The capability subclass is IIe.

295A—Mokena loam, 0 to 3 percent slopes. This nearly level, somewhat poorly drained soil is on convex

slopes and narrow flats in the uplands. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is black, friable loam about 9 inches thick. The subsurface layer is very dark gray, friable loam about 5 inches thick. The subsoil is about 27 inches thick. It is mottled. The upper part is dark grayish brown, firm clay loam; the next part is grayish brown, friable fine sandy loam; and the lower part is gray, firm silty clay. The substratum to a depth of 60 inches is gray, mottled, very firm silty clay. In places the outwash layer is thicker. In some small areas the upper part of the subsoil contains more clay. In other small areas the slope is more than 3 percent.

Included with this soil in mapping are small areas of the poorly drained Bryce soils. These soils are in shallow depressions and drainageways and are subject to ponding. They make up 2 to 10 percent of the unit.

Air and water move through the upper part of the subsoil in the Mokena soil at a moderately slow rate and through the lower part of the subsoil and the substratum at a slow rate. Surface runoff is medium in cultivated areas. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to hay and pasture. It is poorly suited to dwellings and septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, the seasonal high water table delays planting in some years. It can be lowered, however, by subsurface drains. Returning crop residue to the soil helps to maintain tilth and fertility.

If this soil is used as a site for dwellings or septic tank absorption fields, the seasonal high water table is a limitation. Also, the slow permeability is a limitation in septic tank absorption fields. The water table can be lowered by installing underground drains in coarse grained material around the footings of the dwellings and by installing underground drains in septic tank absorption fields. Enlarging the absorption area helps to overcome the slow absorption of liquid waste.

The capability subclass is IIw.

306A—Allison silty clay loam, 0 to 3 percent slopes. This nearly level, well drained soil is on flood plains and in some drainageways that extend into the uplands. It is frequently flooded for brief periods in winter and early in spring. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is very dark grayish brown, friable silty clay loam about 12 inches thick. The subsurface layer is very dark grayish brown, friable silty clay loam about 8 inches thick. The subsoil to a depth of

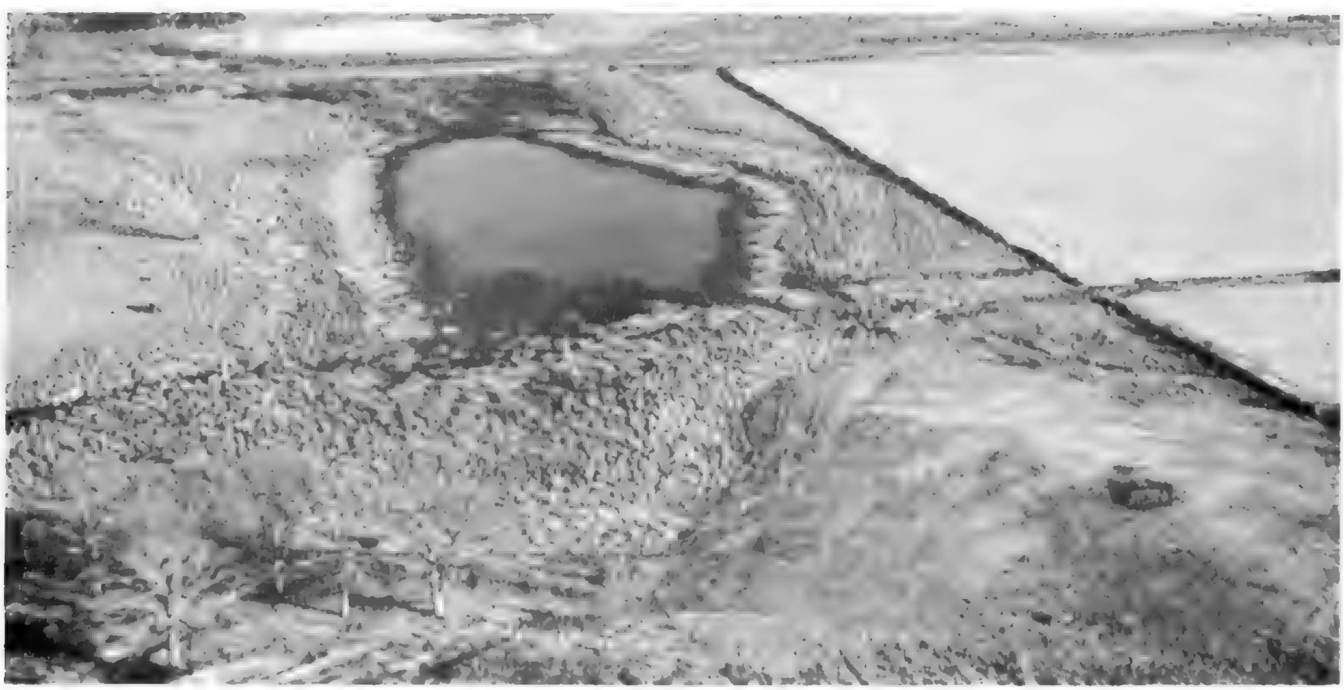


Figure 13.—A ponded area of Aurelius muck. This soil is suitable for wetland wildlife habitat.

more than 60 inches is silty clay loam. The upper part is dark brown and firm, and the lower part is dark yellowish brown, friable, and calcareous. In places the dark surface layer is thinner. In some small areas the slope is more than 3 percent.

Included with this soil in mapping are small areas of the poorly drained Comfrey and Sawmill soils and the somewhat poorly drained Tice soils. Comfrey and Sawmill soils are in shallow depressions and drainageways. Tice soils are slightly lower on the landscape than the Allison soil. Included soils make up 2 to 10 percent of the unit.

Air and water move through the Allison soil at a moderate rate. Surface runoff is slow in cultivated areas. Available water capacity is high. Organic matter content is moderate. Tilling the soil is moderately difficult because of the high content of clay in the surface layer. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for pasture. This soil is well suited to cultivated crops and to pasture and hay. It generally is unsuited to dwellings and septic tank absorption fields because of the flooding.

In the areas used for corn, soybeans, or small grain, the floodwater delays planting in some years. Returning crop residue to the soil improves tilth and helps to maintain fertility.

In the areas used for pasture, overgrazing causes surface compaction and reduces forage yields. Pasture rotation, deferment of grazing until the grasses reach a minimum grazing height, and applications of fertilizer help to keep the pasture and the soil in good condition.

The capability class is I.

319—Aurelius muck. This nearly level and depressional, very poorly drained soil is in upland bogs. It is ponded for long periods (fig. 13). Individual areas are irregular in shape and range from 3 to 40 acres in size.

Typically, the surface layer is black muck about 14 inches thick. Below this, in sequence downward, is about 6 inches of very dark grayish brown organic material, 10 inches of grayish brown and gray, calcareous organic material, and 8 inches of very dark gray, calcareous organic material. The substratum to a depth of 60 inches is mottled gray and olive, loose very fine sand. In some areas the organic layer is thicker.

Included with this soil in mapping are small areas of the loamy or sandy Gilford and Granby soils. These soils are higher on the landscape than the Aurelius soil. They make up 5 to 10 percent of the unit.

Air and water move through the organic part of the Aurelius soil at a moderately slow rate and through the substratum at a rapid rate. Runoff is very slow or ponded in cultivated areas. The seasonal high water table is near or above the surface in winter and spring. Available water capacity and the potential for frost action are high. Organic matter content also is high. The soil is very unstable. It is highly compressible when supporting a heavy load and is subject to subsidence when drained.

Most areas have been drained and are used for corn, soybeans, and small grain. This soil is moderately suited to cultivated crops and to hay and pasture. It generally is unsuited to dwellings and septic tank absorption fields because it is subject to ponding and is unstable.

In the cultivated areas the seasonal high water table and the ponding delay planting, damage crops, and reduce productivity. Subsurface drains help to lower the water table. Surface drains help to control the ponding.

The capability subclass is IIIw.

330—Peotone silty clay loam. This nearly level and depressional, very poorly drained soil is on concave slopes and in depressions in the uplands. It is ponded for brief periods. Individual areas are irregular in shape and range from 3 to 40 acres in size.

Typically, the surface layer is black silty clay loam about 12 inches thick. It is friable in the upper part and firm in the lower part. The subsoil is about 40 inches thick. It is firm. The upper part is black silty clay; the next part is very dark gray, mottled silty clay; and the lower part is gray, mottled silty clay loam. The substratum to a depth of 60 inches is gray, mottled firm silty clay loam. In some places the subsoil contains more clay. In other places it contains less clay. In some areas the dark surface soil is thinner.

Air and water move through this soil at a moderately slow rate. Surface runoff is very slow or ponded in cultivated areas. The seasonal high water table is near or above the surface in winter and spring. Available water capacity is high. Organic matter content also is high. Tilling the soil is moderately difficult because of the high content of clay in the surface layer. The shrink-swell potential and the potential for frost action are high.

Most areas are cultivated. This soil is well suited to cultivated crops and is moderately well suited to pasture and hay and to openland wildlife habitat. It is poorly suited to dwellings, lawns and ornamental trees and shrubs, local roads and streets, and septic tank absorption fields.

Because a drainage system has been installed, this soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain the drainage system are needed. Tile drains and surface drains function satisfactorily if suitable outlets are available. Keeping tillage at a minimum and returning crop residue to the soil improve tilth and help to maintain fertility.

If this soil is used as a site for dwellings, the ponding is a hazard and the shrink-swell potential a limitation. The ponding can be controlled by lowering the water table with underground drains and by installing surface drains. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Installing a drainage system helps to establish lawns and ornamental trees and shrubs.

If this soil is used as a septic tank absorption field, the ponding is a hazard and the moderately slow permeability a limitation. A drainage system is needed. Also, providing as much as 2 feet of loamy fill material is beneficial because it increases the depth to the seasonal high water table. Enlarging the absorption area helps to overcome the slow absorption of liquid waste.

The capability subclass is IIw.

375B—Rutland silty clay loam, 1 to 5 percent slopes. This gently sloping, somewhat poorly drained soil is on convex slopes in the uplands. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is black, friable silty clay loam about 9 inches thick. The subsurface layer is black, firm silty clay loam about 4 inches thick. The subsoil is about 42 inches thick. It is mottled. The upper part is dark brown, firm silty clay; the next part is brown, friable silty clay loam and silt loam; and the lower part is light olive brown, firm, calcareous silty clay. The substratum to a depth of 60 inches is olive, mottled, very firm, calcareous silty clay. In some places the surface layer is lighter in color as a result of erosion. In other places the soil is not so deep to very firm, calcareous silty clay. In some areas the subsoil contains more clay. In some small areas the slope is less than 1 or more than 5 percent.

Air and water move through the subsoil at a moderately slow rate and through the substratum at a slow rate. Surface runoff is medium in cultivated areas. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity is high. Organic matter content also is high. Tilling the soil is moderately difficult because of the high content of clay in the surface layer. The shrink-swell potential and the potential for frost action are high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to hay and pasture. It is poorly suited to dwellings and septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, erosion is a hazard. It can be controlled, however, by terraces, contour farming, or a system of conservation tillage that leaves crop residue on the surface after planting. The seasonal high water table delays planting in some years. It can be lowered, however, by subsurface drains. Returning crop residue to the soil improves tilth and helps to maintain fertility.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Installing tile drains at the base of the foundation reduces the wetness.

If this soil is used as a septic tank absorption field, the seasonal high water table and the slow permeability are limitations. Underground drains help to lower the water table. Enlarging the absorption area helps to overcome the slow absorption of liquid waste.

The capability subclass is IIe.

398—Wea silt loam. This nearly level, well drained soil is on broad flats and convex slopes on outwash plains. Individual areas are irregular in shape and range from 3 to several hundred acres in size.

Typically, the surface layer is black, friable silt loam about 10 inches thick. The subsurface layer is very dark grayish brown, friable silt loam about 4 inches thick. The subsoil is about 27 inches thick. The upper part is dark yellowish brown, friable silt loam; the next part is dark yellowish brown, friable clay loam; and the lower part is brown, firm gravelly loam. The substratum to a depth of 60 inches is mottled brown and light yellowish brown, loose sand and gravel. In places the soil is deeper to sand and gravel. In some small areas the slope is more than 2 percent.

Included with this soil in mapping are small areas of the somewhat poorly drained La Hogue soils and the poorly drained Ruark soils. La Hogue soils are lower on the landscape than the Wea soil. Ruark soils are in shallow depressions and drainageways and are subject to ponding. Included soils make up 2 to 10 percent of the unit.

Air and water move through the subsoil of the Wea soil at a moderate rate and through the substratum at a very rapid rate. Surface runoff is slow in cultivated areas. Available water capacity and organic matter content are moderate. The shrink-swell potential and the potential for frost action also are moderate.

Most areas are cultivated. This soil is well suited to cultivated crops and to pasture and hay, openland wildlife habitat, lawns and ornamental trees and shrubs, and septic tank absorption fields. It is moderately well suited to dwellings and local roads and streets. It is a probable source of sand and gravel.

Few limitations affect the use of this soil for corn, soybeans, or small grain. Keeping tillage at a minimum and returning crop residue to the soil help to maintain tilth and fertility.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Reinforcing foundations, however, helps to prevent the structural damage caused by shrinking and swelling.

The capability class is I.

405—Zook silty clay. This nearly level, poorly drained soil is on flood plains and in some drainageways that extend into the uplands. It is frequently flooded for brief periods from March through June. Individual areas are irregular in shape and range from 3 to several hundred acres in size.

Typically, the surface layer is black, firm silty clay about 7 inches thick. The subsurface layer is about 11

inches of black, firm silty clay and silty clay loam. The subsoil is mottled, firm silty clay about 35 inches thick. The upper part is black, and the lower part is very dark gray and dark gray. The substratum to a depth of 60 inches is mottled dark gray, olive gray, yellowish brown, and strong brown, firm silty clay loam. In some areas the surface soil and subsoil are thinner. In other areas the subsoil contains less clay.

Air and water move through this soil at a slow rate. Surface runoff is slow in cultivated areas. The seasonal high water table is within a depth of 2 feet. Available water capacity is moderate. Organic matter content is high. Tilling the soil is moderately difficult because of the high content of clay in the surface layer. The shrink-swell potential and the potential for frost action are high.

Most areas are used for pasture and hay. This soil is moderately suited to cultivated crops and to pasture and hay. It generally is unsuited to dwellings and septic tank absorption fields because of the flooding, the seasonal high water table, the shrink-swell potential, and the slow permeability.

If this soil is used for corn, soybeans, or small grain, the seasonal high water table delays planting and reduces productivity in most years. The floodwater also delays planting and damages crops. Subsurface drains help to lower the water table. Dikes help to control the flooding. Returning crop residue to the soil improves tilth and helps to maintain fertility.

In the areas used for pasture, deferment of grazing when the soil is too wet increases forage production and helps to prevent surface compaction and deterioration of tilth. Proper stocking rates, pasture rotation, deferment of grazing until the grasses reach a minimum grazing height, and applications of fertilizer help to keep the pasture and the soil in good condition.

The capability subclass is IIIw.

440B—Jasper silt loam, 1 to 5 percent slopes. This gently sloping, well drained soil is on convex slopes on outwash plains. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 7 inches thick. The subsurface layer is very dark grayish brown, friable silt loam about 4 inches thick. The subsoil is loam about 30 inches thick. The upper part is dark brown and dark yellowish brown and is friable, and the lower part is dark yellowish brown and yellowish brown and is firm. The substratum to a depth of 60 inches is mottled light brownish gray and yellowish brown, friable silt loam, loamy sand, and sandy loam. In some places the surface layer is lighter in color as a result of erosion. In other places the slope is less than 1 or more than 5 percent. In some areas calcareous silty clay is within a depth of 60 inches. In other areas the subsoil contains less sand.

Included with this soil in mapping are small areas of the somewhat poorly drained Harco and La Hogue soils. These soils are lower on the landscape than the Jasper soil and have a seasonal high water table at a depth of 1 to 3 feet. They make up 5 to 15 percent of the unit.

Air and water move through the Jasper soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content also is high. The potential for frost action is moderate.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops, to hay and pasture, to dwellings, and to septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, erosion is a hazard. It can be controlled, however, by terraces, contour farming, or a system of conservation tillage that leaves crop residue on the surface after planting.

The capability subclass is IIe.

443B—Barrington silt loam, 1 to 3 percent slopes. This gently sloping, moderately well drained soil is on convex slopes on outwash plains. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 10 inches thick. The subsurface layer is dark brown, friable silt loam about 4 inches thick. The subsoil is about 16 inches thick. The upper part is dark yellowish brown, friable silty clay loam; the next part is dark yellowish brown and yellowish brown, mottled, firm silty clay loam; and the lower part is yellowish brown, mottled, firm clay loam. The substratum to a depth of 60 inches is yellowish brown, dark grayish brown, brown, and grayish brown, friable and firm stratified clay loam, gravelly clay loam, fine sandy loam, silt loam, and silty clay loam. In some areas the subsoil contains more sand. In other areas the slope is less than 1 or more than 3 percent. In some small areas the depth to the seasonal high water table is less than 3 feet.

Air and water move through this soil at a moderate rate. Surface runoff is medium in cultivated areas. The seasonal high water table is at a depth of 3 to 6 feet. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops, to hay and pasture, and to dwellings without basements. It is moderately suited to dwellings with basements and is poorly suited to septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, erosion is a hazard. It can be controlled, however, by terraces, contour farming, or a system of conservation tillage that leaves crop residue on the surface after planting.

If this soil is used as a site for dwellings with basements or for septic tank absorption fields, the seasonal high water table is a limitation. It can be lowered, however, by installing underground drains

around the footings of the dwellings and by installing underground curtain drains in septic tank absorption fields.

The capability subclass is IIe.

484—Harco silt loam. This nearly level, somewhat poorly drained soil is on convex slopes and narrow flats on upland stream terraces. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is black, friable silt loam about 9 inches thick. The subsurface layer is black, friable silt loam about 4 inches thick. The subsoil is silty clay loam about 27 inches thick. The upper part is very dark grayish brown and friable; the next part is dark brown, mottled, and firm; and the lower part is grayish brown, mottled, firm, and calcareous. The substratum to a depth of 60 inches is mottled light gray and brown, friable, calcareous silt loam and silty clay loam. In places the surface layer is lighter in color as a result of erosion. In some small areas the subsoil contains more clay. In others the depth to the seasonal high water table is more than 3 feet. In some small areas the slope is more than 2 percent.

Air and water move through this soil at a moderate rate. Surface runoff is slow in cultivated areas. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, to pasture and hay, and to openland wildlife habitat. It is moderately well suited to lawns and ornamental trees and shrubs and is poorly suited to dwellings, septic tank absorption fields, and local roads and streets.

In the areas used for corn, soybeans, or small grain, a drainage system may be needed to improve productivity. Tile drains function satisfactorily if suitable outlets are available. Keeping tillage at a minimum and returning crop residue to the soil help to maintain tilth and fertility.

If this soil is used as a site for dwellings or septic tank absorption fields, the seasonal high water table is a limitation. It can be lowered, however, by installing underground drains. The shrink-swell potential is a limitation on sites for dwellings without basements. Reinforcing foundations, however, helps to prevent the structural damage caused by shrinking and swelling. Installing a drainage system helps to establish lawns and ornamental trees and shrubs.

The capability class is I.

490—Odell silt loam. This nearly level, somewhat poorly drained soil is on convex slopes in the uplands. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 7 inches thick. The subsurface layer is very dark gray, friable silt loam about 5 inches thick. The subsoil is about 27 inches thick. The upper part is dark grayish brown and dark brown, mottled, friable clay loam; the next part is brown, mottled, firm clay loam; and the lower part is yellowish brown and pale brown, firm, calcareous loam. The substratum to a depth of 60 inches is mottled yellowish brown and light brownish gray, firm, calcareous loam. In some areas the depth to the seasonal high water table is more than 3 feet. In some small areas the slope is more than 2 percent.

Included with this soil in mapping are small areas of the poorly drained Selma soils. These soils are in shallow depressions and drainageways and are subject to ponding. They make up 2 to 10 percent of the unit.

Air and water move through the Odell soil at a moderately slow rate. Surface runoff is slow in cultivated areas. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, to pasture and hay, and to openland wildlife habitat. It is moderately well suited to lawns and ornamental trees and shrubs and is poorly suited to dwellings, septic tank absorption fields, and local roads and streets.

In the areas used for corn, soybeans, or small grain, a drainage system may be needed to improve productivity. Tile drains function satisfactorily if suitable outlets are available. Returning crop residue to the soil and keeping tillage at a minimum help to maintain fertility and tilth and help to prevent surface crusting.

If this soil is used as a site for dwellings, the seasonal high water table is a limitation. It can be lowered, however, by installing tile drains around the base of foundations. Installing a drainage system helps to establish lawns and ornamental trees and shrubs.

If this soil is used as a septic tank absorption field, the seasonal high water table and the moderately slow permeability are limitations. Underground drains help to lower the water table. Enlarging the absorption area helps to overcome the slow absorption of liquid waste.

The capability class is I.

495B—Corwin loam, 1 to 5 percent slopes. This gently sloping, moderately well drained soil is on convex slopes and narrow flats in the uplands. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is very dark gray, friable loam about 7 inches thick. The subsurface layer is very dark grayish brown, friable loam about 4 inches thick. The subsoil is yellowish brown, firm clay loam about 19 inches thick. It is mottled in the lower part. The substratum to a depth of 60 inches is yellowish brown and mottled yellowish brown and grayish brown, firm, calcareous loam. In some areas the surface layer is

lighter in color as a result of erosion. In other areas the slope is less than 1 or more than 5 percent. In some small areas the depth to the seasonal high water table is less than 3 feet.

Included with this soil in mapping are small areas of the excessively drained Sparta soils. These soils are higher on the landscape than the Corwin soil. Also, they contain more sand and less clay in the subsoil. They make up 2 to 5 percent of the unit.

Air and water move through the Corwin soil at a moderately slow rate. Surface runoff is medium in cultivated areas. The seasonal high water table is at a depth of 3 to 6 feet. Available water capacity is high. Organic matter content also is high. The shrink-swell potential and the potential for frost action are moderate.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to hay and pasture. It is moderately suited to dwellings and is poorly suited to septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, erosion is a hazard. It can be controlled, however, by terraces, contour farming, or a system of conservation tillage that leaves crop residue on the surface after planting.

If this soil is used as a site for dwellings with basements, the seasonal high water table is a limitation. Also, the shrink-swell potential is a limitation on sites for dwellings without basements. Installing tile drains around the base of foundations helps to lower the water table. Reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling. Installing a drainage system helps to establish lawns and ornamental trees and shrubs.

If this soil is used as a septic tank absorption field, the seasonal high water table and the moderately slow permeability are limitations. Underground drains help to lower the water table. Enlarging the absorption area helps to overcome the slow absorption of liquid waste.

The capability subclass is IIe.

495C3—Corwin clay loam, 5 to 12 percent slopes, severly eroded. This moderately sloping, moderately well drained soil is on side slopes in the uplands. Individual areas are irregular in shape and range from 3 to 40 acres in size.

Typically, the surface layer is dark brown, friable clay loam about 7 inches thick. The subsoil is dark yellowish brown and yellowish brown, friable clay loam about 19 inches thick. The substratum to a depth of 60 inches is yellowish brown, mottled, firm, calcareous loam. In places the surface layer is darker. In some small areas the slope is less than 5 or more than 12 percent. In some small areas the depth to the seasonal high water table is less than 3 feet.

Included with this soil in mapping are small areas of the excessively drained Sparta soils. These soils are higher on the landscape than the Corwin soil. Also, they contain more sand and less clay in the subsoil. They make up 2 to 5 percent of the unit.

Air and water move through the Corwin soil at a moderately slow rate. Surface runoff is medium in cultivated areas. The seasonal high water table is at a depth of 3 to 6 feet. Available water capacity is moderate. Organic matter content also is moderate. The surface layer is friable but tends to crust and puddle after hard rains. The shrink-swell potential and the potential for frost action are moderate.

Most areas are used for cultivated crops. This soil is poorly suited to cultivated crops and to hay and pasture. It is moderately suited to dwellings and is poorly suited to septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, further erosion is a hazard (fig. 14). It can be controlled, however, by terraces, contour farming, or a system of conservation tillage that leaves crop residue on the surface after planting. Returning the crop residue to the soil helps to prevent surface crusting, improves tilth, and helps to maintain fertility.

Figure 14.—An area of Corwin clay loam, 5 to 12 percent slopes, severely eroded. The subsoil is exposed because of erosion.

If this soil is used as a site for dwellings, the slope is a limitation. Also, the shrink-swell potential is a limitation on sites for dwellings without basements and the seasonal high water table a limitation on sites for dwellings with basements. Reinforcing foundations helps to prevent the damage caused by shrinking and swelling. Cutting and filling with compacted material and extending the foundation into stable material help to overcome the slope. Underground drains around footings help to lower the water table.

If this soil is used as a septic tank absorption field, the seasonal high water table and the moderately slow permeability are limitations. Underground drains help to lower the water table. Enlarging the absorption area helps to overcome the slow absorption of liquid waste.

The capability subclass is IVe.

501—Morocco fine sand. This nearly level, somewhat poorly drained soil is on convex slopes and broad flats on outwash plains. Individual areas are irregular in shape and range from 3 to several hundred acres in size.

Typically, the surface layer is very dark gray, very friable fine sand about 4 inches thick. The subsurface layer is brown, loose fine sand about 6 inches thick. The subsoil is mottled, loose fine sand about 27 inches thick. The upper part is pale brown, and the lower part is very pale brown. The substratum to a depth of 60 inches is very pale brown, mottled, loose fine sand. In places the surface layer is darker. In some small areas the subsoil contains more clay. In other small areas the slope is more than 2 percent.

Included with this soil in mapping are small areas of the well drained Oakville soils and the excessively drained Chelsea and Sparta soils. These soils are higher on the landscape than the Morocco soil and have a seasonal high water table at a depth of more than 6 feet. They make up 5 to 15 percent of the unit.

Air and water move through the Morocco soil at a rapid rate. Surface runoff is very slow in cultivated areas. The seasonal high water table is at a depth of 1 to 2 feet. Available water capacity is low. Organic matter content also is low. The subsoil is medium acid to very strongly acid. The potential for frost action is moderate.

Most areas are used for cultivated crops. This soil is poorly suited to cultivated crops and to hay and pasture. It is moderately suited to woodland. It is poorly suited to dwellings and generally is unsuited to septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, soil blowing is a hazard and the low available water capacity a limitation. Field windbreaks and a cover of crop residue help to prevent excessive soil loss and the crop damage caused by windblown soil particles. Returning crop residue to the soil conserves moisture, helps to maintain tilth, and improves fertility.

Figure 15.—An area of Granby fine sandy loam. The water table is at the surface early in spring.

If this soil is used for pasture or hay, the seasonal high water table reduces productivity. Deferment of grazing when the soil is too wet improves forage production and helps to prevent surface compaction and deterioration of tilth.

If this soil is used as a site for dwellings or septic tank absorption fields, the seasonal high water table is a limitation. It can be lowered, however, by underground drains around the footings of the dwellings and in the absorption fields. The soil readily absorbs but does not adequately filter the effluent in these fields. The poor filtering capacity may result in the pollution of ground water. The septic tank system functions satisfactorily only if a sealed sand filter and a disinfection tank are installed.

The capability subclass is IVs.

513—Granby fine sandy loam. This nearly level, very poorly drained soil is on flats and in depressions on outwash plains. It is ponded for brief periods in the spring. Individual areas are irregular in shape and range from 3 to several hundred acres in size.

Typically, the surface layer is black, very friable fine sandy loam about 8 inches thick. The subsurface layer is very dark grayish brown, mottled, very friable loamy sand about 9 inches thick. The upper part of the substratum is dark grayish brown, mottled, loose loamy fine sand. The lower part to a depth of 60 inches is mottled grayish brown, brown, and olive gray, loose fine sand. In some places the subsoil contains more clay. In other places the surface layer is thicker. In some areas the depth to the seasonal high water table is more than 1 foot.

Included with this soil in mapping are small areas of the organic Aurelius and Houghton soils. These soils are lower on the landscape than the Granby soil. They make up 5 to 10 percent of the unit.

Air and water move through the Granby soil at a rapid rate. Surface runoff is very slow or ponded in cultivated areas. The seasonal high water table is near or above the surface in winter and spring (fig. 15). Available water capacity is moderate. Organic matter content is high. The potential for frost action is moderate.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops and to hay and pasture. It is poorly suited to woodland and to dwellings and generally is unsuited to septic tank absorption fields.

The areas used for corn, soybeans, or small grain have been drained. The seasonal high water table, however, delays planting and reduces productivity. Also, soil blowing is a hazard and the moderate available water capacity a limitation. Field windbreaks and a cover of crop residue help to prevent excessive soil loss and the crop damage caused by windblown soil particles. Measures that maintain or improve the drainage system are needed in some areas. Returning crop residue to the soil conserves moisture and helps to maintain tilth and fertility.

If this soil is used for pasture or hay, the seasonal high water table reduces productivity. It can be lowered, however, by subsurface drains. Deferment of grazing when the soil is too wet increases forage production and helps to prevent surface compaction and deterioration of tilth.

If this soil is used as a site for dwellings, the ponding is a hazard. It can be controlled, however, by providing a layer of suitable soil material, so that surface drainage is improved and the foundation is above the water table. Underground drains around footings or interceptor drains also help to overcome this hazard.

If this soil is used as a septic tank absorption field, the ponding is a hazard. Also, the soil readily absorbs but does not adequately filter the effluent. The poor filtering capacity may result in the pollution of ground water. The septic tank system functions satisfactorily only if the water table is lowered and a sealed sand filter and a disinfection tank are installed.

The capability subclass is IVw.

560E—St. Clair loam, 12 to 30 percent slopes. This moderately steep, moderately well drained soil is on side slopes in the uplands. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is very dark gray and dark grayish brown, friable loam about 6 inches thick. The subsurface layer is dark brown, firm clay loam about 2 inches thick. The subsoil is silty clay about 16 inches thick. The upper part is dark brown and firm; the next part is dark grayish brown, mottled, and very firm; and the lower part is dark grayish brown, mottled, very firm, and calcareous. The substratum to a depth of 60 inches is dark grayish brown and olive gray, mottled, very firm, calcareous silty clay. In some small areas the slope is less than 12 or more than 30 percent. In some areas the surface layer is darker. In other areas the depth to the seasonal high water table is less than 2 feet.

Air and water move through this soil at a very slow rate. Surface runoff is rapid in cultivated areas. The seasonal high water table is at a depth of 2 to 3 feet. Available water capacity is moderate. Organic matter content is moderately low. The shrink-swell potential is high, and the potential for frost action is moderate.

Most areas are used for cultivated crops. This soil generally is unsuited to cultivated crops and is poorly suited to pasture and hay because it is subject to erosion. It is moderately suited to woodland. It is poorly suited to dwellings and generally is unsuited to septic tank absorption fields because of the seasonal high water table, the very slow permeability, and the slope.

In the areas used for pasture and hay, erosion is a hazard. Pasture rotation, deferment of grazing until the grasses reach a minimum grazing height, and

applications of fertilizer help to keep the pasture in good condition and help to control erosion.

If this soil is used as a site for dwellings, the slope and the shrink-swell potential are limitations. Also, the seasonal high water table is a limitation on sites for dwellings with basements. Cutting and filling with compacted material and extending foundations into stable material help to overcome the slope. Reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling. Installing drains in coarse grained material around footings helps to lower the water table.

The capability subclass is VIe.

570B—Martinsville loam, 1 to 5 percent slopes. This gently sloping, well drained soil is on convex slopes on outwash plains. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is dark brown, friable loam about 10 inches thick. The subsurface layer is dark yellowish brown, friable loam about 3 inches thick. The subsoil is about 43 inches thick. It is friable. The upper part is dark yellowish brown loam, the next part is dark yellowish brown fine sandy loam, and the lower part is dark brown fine sandy loam. The substratum to a depth of 60 inches is dark brown, friable loamy fine sand. In some places the surface layer is darker. In other places compact, calcareous loam is within a depth of 60 inches. In some small areas the slope is less than 1 or more than 5 percent.

Included with this soil in mapping are small areas of the excessively drained Chelsea soils and the somewhat poorly drained Roby soils. Chelsea soils are higher on the landscape than the Martinsville soil. Also, their subsoil contains more sand. Roby soils are lower on the landscape than the Martinsville soil. They have a seasonal high water table at a depth of 1 to 3 feet. Included soils make up 2 to 10 percent of the unit.

Air and water move through the Martinsville soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content is moderately low. The surface soil is slightly acid, and the subsoil is slightly acid or medium acid. The surface layer is friable but tends to crust and puddle after hard rains. The potential for frost action is moderate.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to hay and pasture, woodland dwellings, and septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, erosion is a hazard. It can be controlled, however, by terraces, contour farming, or a system of conservation tillage that leaves crop residue on the surface after planting. Returning crop residue to the soil helps to prevent surface crusting and improves tilth.

If this soil is used for pasture or hay, erosion is a hazard. Pasture rotation, deferment of grazing until the grasses reach a minimum grazing height, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

The capability subclass is IIe.

570C2—Martinsville loam, 5 to 10 percent slopes, eroded. This moderately sloping, well drained soil is on side slopes on outwash plains. Individual areas are irregular in shape and range from 3 to 40 acres in size.

Typically, the surface layer is very dark gray, friable loam about 8 inches thick. The subsurface layer is brown, friable loam about 3 inches thick. The subsoil is about 44 inches thick. It is friable. The upper part is dark yellowish brown loam, the next part is strong brown clay loam, and the lower part is brown clay loam. The substratum to a depth of 60 inches is light yellowish brown, mottled, friable, calcareous silt loam. In some places the surface layer is lighter in color as a result of erosion. In other places compact, calcareous loam is within a depth of 60 inches. In some areas the lower part of the subsoil and the substratum are calcareous sand and gravel. In some small areas the slope is less than 5 or more than 10 percent.

Included with this soil in mapping are small areas of the somewhat poorly drained Roby soils. These soils are on or above shoulder slopes and are higher on the landscape than the Martinsville soil. They have a seasonal high water table at a depth of 1 to 3 feet. They make up 5 to 10 percent of the unit.

Air and water move through the Martinsville soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content is moderately low. The surface layer is slightly acid, and the subsoil is slightly acid or medium acid. The surface layer is friable but tends to crust and puddle after hard rains. The shrink-swell potential and the potential for frost action are moderate.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops and is well suited to hay, pasture, and woodland. It is moderately suited to dwellings and is well suited to septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, further erosion is a hazard. It can be controlled, however, by terraces, contour farming, or a system of conservation tillage that leaves crop residue on the surface after planting or by a combination of these. Returning crop residue to the soil helps to prevent surface crusting and improves tilth.

If this soil is used for pasture or hay, further erosion is a hazard. Pasture rotation, deferment of grazing until the grasses reach a minimum grazing height, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Reinforcing foundations,

however, helps to prevent the structural damage caused by shrinking and swelling.

The capability subclass is IIIe.

570D2—Martinsville loam, 10 to 18 percent slopes, eroded. This strongly sloping, well drained soil is on side slopes on outwash plains. Individual areas are irregular in shape and range from 3 to 40 acres in size.

Typically, the surface layer is dark grayish brown, friable loam about 8 inches thick. The subsurface layer is brown, friable fine sandy loam about 4 inches thick. The subsoil is about 34 inches thick. The upper part is yellowish brown, friable fine sandy loam; the next part is yellowish brown, firm sandy clay loam; and the lower part is mottled light brownish gray and yellowish brown, firm clay loam and silty clay loam. The substratum to a depth of 60 inches is light olive brown and yellowish brown, firm, calcareous silt loam. In places the surface layer is darker. In some small areas the slope is less than 10 or more than 18 percent. In others compact, calcareous loam is at a depth of more than 60 inches. In some areas the lower part of the subsoil and the substratum are calcareous sand and gravel.

Included with this soil in mapping are small areas of the somewhat poorly drained Roby soils. These soils are on or above shoulder slopes and are higher on the landscape than the Martinsville soil. They have a seasonal high water table at a depth of 1 to 3 feet. They make up 5 to 10 percent of the unit.

Air and water move through the Martinsville soil at a moderate rate. Surface runoff is rapid in cultivated areas. Available water capacity is high. Organic matter content is moderately low. The subsoil is medium acid. The surface layer is friable but tends to crust and puddle after hard rains. The shrink-swell potential and the potential for frost action are moderate.

Most areas are used for pasture and hay (fig. 16). This

Figure 16.—A pastured area of Martinsville loam, 10 to 18 percent slopes, eroded.

soil is poorly suited to cultivated crops and to hay and pasture. It is well suited to woodland. It is moderately suited to dwellings and septic tank absorption fields.

In the areas used for pasture and hay, further erosion is a hazard. Pasture rotation, deferment of grazing until the grasses reach a minimum grazing height, and applications of fertilizer help to keep the pasture and the soil in good condition.

If this soil is used as a site for dwellings or septic tank absorption fields, the slope is a limitation. Also, the shrink-swell potential is a limitation on sites for dwellings. Reinforcing foundations, however, helps to prevent the structural damage caused by shrinking and swelling. On sites for dwellings, the slope can be overcome by cutting and filling with compacted material and by extending the foundation into stable material. In septic tank absorption fields, it can be overcome by installing the filter lines on the contour.

The capability subclass is IVe.

594—Reddick clay loam. This nearly level, poorly drained soil is in broad areas and, to a lesser extent, in narrow drainageways on outwash plains, stream terraces, and lake plains. It is subject to ponding for brief periods early in spring. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is black, firm clay loam about 7 inches thick. The subsurface layer is very dark gray, mottled, firm clay loam about 4 inches thick. The subsoil is about 34 inches thick. The upper part is grayish brown, mottled, firm clay loam, and the lower part is mottled gray and dark brown, very firm silty clay. The substratum to a depth of 60 inches is mottled gray and dark brown, very firm, calcareous silty clay. In some places the subsoil contains more clay. In other places the depth to the seasonal high water table is more than 2 feet. In some areas the soil is deeper to a slowly permeable or very slowly permeable layer.

Air and water move through the upper part of the subsoil at a moderate rate and through the lower part and the substratum at a slow or very slow rate. Surface runoff is slow to ponded in cultivated areas. The seasonal high water table is within a depth of 2 feet. Available water capacity is high. Organic matter content also is high. Tilling the soil is moderately difficult because of the high content of clay in the surface layer. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops and is moderately well suited to pasture and hay and to openland wildlife habitat. It is poorly suited to dwellings, lawns and ornamental trees and shrubs, local roads and streets, and septic tank absorption fields.

Because a drainage system has been installed, this soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain the drainage system are needed. Tile drains and surface drains function satisfactorily if suitable outlets are available. Keeping tillage at a minimum and returning crop residue to the soil improve tilth and fertility.

If this soil is used as a site for dwellings, the seasonal high water table is a limitation. It can be lowered, however, by underground drains. Surface drains also are needed. Installing a drainage system helps to establish lawns and ornamental trees and shrubs.

If this soil is used as a septic tank absorption field, the seasonal high water table and the slow or very slow permeability are limitations. A drainage system is needed. Also, providing as much as 2 feet of loamy fill material is beneficial because it increases the depth to the seasonal high water table. Enlarging the absorption area helps to overcome the slow absorption of liquid waste.

The capability subclass is IIw.

741B—Oakville fine sand, 1 to 5 percent slopes. This gently sloping, well drained soil is on convex slopes on outwash plains, lake plains, and glacial till plains. Individual areas are irregular in shape and range from 3 to 160 acres in size.

Typically, the surface layer is dark grayish brown, loose fine sand about 3 inches thick. The subsoil is brown, loose fine sand about 30 inches thick. The substratum to a depth of 60 inches is yellowish brown, loose fine sand. In places the surface layer is darker. In some areas the slope is less than 1 or more than 5 percent.

Included with this soil in mapping are small areas of the somewhat poorly drained Morocco and Watseka soils. These soils are lower on the landscape than the Oakville soil. They make up 2 to 10 percent of the unit.

Air and water move through the Oakville soil at a rapid rate. Surface runoff is very slow in cultivated areas. Available water capacity is low. Organic matter content also is low.

Most areas are used for pasture or hay. This soil is poorly suited to cultivated crops and is moderately suited to pasture, hay, and woodland. It is well suited to dwellings. It generally is unsuited to septic tank absorption fields because of a poor filtering capacity, which may result in the pollution of ground water.

If this soil is used for corn, soybeans, or small grain, soil blowing is a hazard and the low available water capacity a limitation. Field windbreaks and a cover of crop residue help to prevent excessive soil loss and the crop damage caused by windblown soil particles. Leaving crop residue on the surface conserves moisture and helps to maintain tilth and fertility.

In the areas used for pasture or hay, the low available water capacity is a limitation. Pasture rotation, deferment of grazing until the grasses reach a minimum grazing height, and applications of fertilizer help to keep the pasture and the soil in good condition.

The capability subclass is IVs.

741C—Oakville fine sand, 5 to 12 percent slopes. This moderately sloping, well drained soil is on convex slopes on outwash plains, lake plains, and glacial till plains. Individual areas are irregular in shape and range from 3 to 160 acres in size.

Typically, the surface layer is dark grayish brown, loose fine sand about 5 inches thick. The subsoil is brownish yellow and dark yellowish brown, loose fine sand about 17 inches thick. The substratum to a depth of 60 inches is brownish yellow, loose fine sand. In places the surface layer is darker. In some areas the slope is less than 5 or more than 12 percent.

Included with this soil in mapping are small areas of the somewhat poorly drained Morocco and Watseka soils. These soils are lower on the landscape than the Oakville soil. They make up 2 to 10 percent of the unit.

Air and water move through the Oakville soil at a rapid rate. Surface runoff is very slow in cultivated areas. Available water capacity is low. Organic matter content also is low.

Most areas are used for pasture or hay. This soil is poorly suited to cultivated crops. It is moderately suited to hay, pasture, woodland, and dwellings. It generally is unsuited to septic tank absorption fields because of a poor filtering capacity, which may result in the pollution of ground water.

If this soil is used for corn, soybeans, or small grain, soil blowing is a hazard and the low available water capacity a limitation. Field windbreaks and a cover of crop residue help to prevent excessive soil loss and the crop damage caused by windblown soil particles. Leaving crop residue on the surface conserves moisture and helps to maintain tilth and fertility.

In the areas used for pasture or hay, the low available water capacity is a limitation. Pasture rotation, deferment of grazing until the grasses reach a minimum grazing height, and applications of fertilizer help to keep the pasture and the soil in good condition.

If this soil is used as a site for dwellings, the slope is a limitation. It can be overcome, however, by cutting and filling with compacted material and by extending the foundation into stable material. If a septic tank system is installed, a sealed sand filter and a disinfection tank are needed.

The capability subclass is IVs.

776—Comfrey loam. This nearly level, poorly drained soil is on flood plains, on alluvial fans, and in some drainageways that extend into the uplands. It is frequently flooded for brief periods from March through June. Individual areas are irregular in shape and range from 3 to several hundred acres in size.

Typically, the surface layer is black, friable loam about 11 inches thick. The subsurface layer is black and very dark gray, friable loam about 14 inches thick. The subsoil is firm clay loam about 16 inches thick. The upper part is very dark gray and mottled, and the lower part is mottled dark gray and yellowish brown. The substratum to a depth of 60 inches is mottled gray and yellowish brown, friable loam. In some areas the subsoil contains less sand. In other areas the depth to the seasonal high water table is more than 3 feet. In places the soil is dark to a depth of more than 36 inches.

Included with this soil in mapping are small areas of the slowly permeable Zook soils in similar positions on the landscape. These soils contain more clay in the subsoil than the Comfrey soil. They make up 2 to 10 percent of the unit.

Air and water move through the Comfrey soil at a moderate rate. Surface runoff is slow in cultivated areas. The seasonal high water table is within a depth of 3 feet. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for pasture or hay. This soil is well suited to cultivated crops and to pasture and hay. It generally is unsuited to dwellings and septic tank absorption fields because of the flooding.

The areas used for corn, soybeans, or small grain are adequately protected from floodwater. Tile drains and surface drains help to prevent excessive wetness. Keeping tillage at a minimum and returning crop residue to the soil help to maintain tilth and fertility.

If this soil is used for pasture or hay, a drainage system and measures that control flooding are needed. Overgrazing reduces forage yields and causes surface compaction and poor tilth. Restricted use during wet periods helps to keep the pasture and the soil in good condition.

This soil provides good habitat for wetland wildlife. In most areas it is on both sides of the major streams, which provide habitat for game fish. Shallow water areas are available. Also available are grain and seed crops, wild herbaceous plants, wetland plants, and other important habitat elements.

The capability subclass is IIw.

779B—Chelsea fine sand, 1 to 5 percent slopes. This gently sloping, excessively drained soil is on convex slopes in the uplands. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is dark brown, very friable fine sand about 8 inches thick. The subsurface layer is dark yellowish brown and yellowish brown, loose fine sand about 33 inches thick. The subsoil to a depth of more than 60 inches is dark yellowish brown, very friable fine sand that has bands of brown loamy fine sand. In some places the surface layer is darker. In other places the subsoil has no bands of loamy fine sand. In some areas it contains more clay. In other areas the slope is less than 1 or more than 5 percent.

Included with this soil in mapping are small areas of the somewhat poorly drained Morocco and Watseka soils. These soils are lower on the landscape than the Chelsea soil. They make up 2 to 10 percent of the unit.

Air and water move through the Chelsea soil at a rapid rate. Surface runoff is medium in cultivated areas. Available water capacity is low. Organic matter content also is low. The subsoil is medium acid.

Most areas are used for cultivated crops. This soil is poorly suited to cultivated crops and is moderately suited to pasture, hay, and woodland. It is well suited to dwellings and generally is unsuited to septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, soil blowing is a hazard (fig. 17) and the low available water capacity a limitation (fig. 18). Field windbreaks and a cover of crop residue help to prevent excessive soil loss and the crop damage caused by windblown soil particles. Leaving crop residue on the surface conserves moisture, helps to maintain tilth, and improves fertility.

Figure 17.—An area of Chelsea fine sand, 1 to 5 percent slopes, which is subject to soil blowing unless crop residue is left on the surface.

If this soil is used for pasture or hay, the low available water capacity is a limitation. Pasture rotation, deferment of grazing until the grasses reach a minimum grazing height, and applications of fertilizer help to keep the pasture and the soil in good condition.

This soil readily absorbs but does not adequately filter the effluent in septic tank absorption fields. The poor filtering capacity may result in the pollution of ground water. The septic tank system can function satisfactorily only if a sealed sand filter and a disinfection tank are installed.

The capability subclass is IVs.

779C—Chelsea fine sand, 5 to 12 percent slopes. This moderately sloping, excessively drained soil is on convex slopes in the uplands. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is brown, loose fine sand about 8 inches thick. The subsurface layer is brown, loose fine sand about 34 inches thick. The subsoil to a depth of more than 60 inches is dark yellowish brown, loose fine sand that has bands of loamy fine sand. In some places the surface layer is darker. In other places the subsoil has no bands of loamy fine sand. In some areas it contains more clay. In other areas the slope is less than 5 or more than 12 percent.

Included with this soil in mapping are small areas of the somewhat poorly drained Morocco and Watseka soils. These soils are lower on the landscape than the Chelsea soil. They make up 5 to 10 percent of the unit.

Air and water move through the Chelsea soil at a rapid rate. Surface runoff is medium in cultivated areas. Available water capacity is low. Organic matter content also is low. The subsoil is slightly acid to strongly acid.

Most areas are used for pasture or hay. This soil is poorly suited to cultivated crops and is moderately suited to pasture, hay, and woodland. It is moderately suited to dwellings and generally is unsuited to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, soil blowing is a hazard and the low available water capacity a limitation. Field windbreaks and a cover of crop residue help to prevent excessive soil loss and the crop damage caused by windblown soil particles. Leaving crop residue on the surface conserves moisture, helps to maintain tilth, and improves fertility.

In the areas used for pasture or hay, the low available water capacity is a limitation. Pasture rotation, deferment of grazing until the grasses reach a minimum grazing height, and applications of fertilizer help to keep the pasture and the soil in good condition.

If this soil is used as a site for dwellings, the slope is a limitation. It can be overcome, however, by cutting and filling with compacted material and by extending the foundation into stable material. The soil readily absorbs but does not adequately filter the effluent in septic tank absorption fields. The poor filtering capacity may result in

Figure 18.—An area of Chelsea fine sand, 1 to 5 percent slopes, used for corn. Yields are adversely affected by the low available water capacity.

the pollution of ground water. The septic tank system can function satisfactorily only if a sealed sand filter and a disinfection tank are installed.

The capability subclass is IVs.

802—Orthents, loamy. These nearly level and gently sloping, somewhat poorly drained soils are in borrow and fill areas. The borrow areas are mainly sand dunes from which soil material has been removed. The fill areas are mainly sites for residential and commercial development. Prior to development, most were made up of poorly drained and very poorly drained soils in low lying positions on the landscape. Individual areas are irregular in shape and range from 2 to 80 acres in size.

Typically, the surface layer is dark grayish brown and brown, friable fine sandy loam or loamy fine sand about 10 inches thick. The substratum to a depth of 60 inches is mottled yellowish brown, dark yellowish brown, and dark grayish brown, friable fine sandy loam. In some areas it has layers of loamy fine sand or fine sand. In places the slope is more than 5 percent.

Included with these soils in mapping are small areas where the seasonal high water table is within a depth of 1 foot or at a depth of more than 3 feet. Included areas make up 2 to 10 percent of the unit.

Air and water move through these soils at a moderate rate. Surface runoff is slow. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity is low. Organic matter content also is low. The potential for frost action is high.

Most areas are used as sites for residential and commercial buildings. These soils are poorly suited to dwellings and commercial buildings and to septic tank absorption fields. They are moderately suited to lawns. Establishing a plant cover is moderately difficult in the borrow areas.

In the areas used as sites for dwellings and commercial buildings, the seasonal high water table is a limitation. It can be lowered, however, by underground drains around the footings. Surface and subsurface wetness can be reduced by providing a layer of suitable soil material, so that the foundation is above the water table. The seasonal high water table also is a limitation in septic tank absorption fields. It can be lowered, however, by underground curtain drains.

If these soils are used for lawns, the seasonal high water table is a limitation in the spring and droughtiness a limitation in the summer. The water table can be lowered by underground drains. Providing an adequate amount of plant nutrients, planting suitable species, increasing mowing heights during the summer, and watering with sprinklers during extended dry periods help to overcome the droughtiness.

No capability class or subclass is assigned.

805—Orthents, clayey. These nearly level and gently sloping, somewhat poorly drained soils are in fill and borrow areas. Individual areas are irregular in shape and range from 2 to 80 acres in size.

Typically, the surface layer is dark grayish brown, firm and very firm silty clay or silty clay loam. The substratum to a depth of 60 inches is mottled dark grayish brown and gray, very firm, calcareous silty clay or silty clay loam. In some areas the slope is more than 5 percent.

Included with these soils in mapping are small areas of strongly sloping soils and small areas where the seasonal high water table is within a depth of 2 feet. Included areas make up 2 to 10 percent of the unit.

Air and water move through these soils at a very slow rate. Surface runoff is slow in the nearly level areas and medium in the gently sloping areas. The seasonal high water table is at a depth of 2 to 4 feet. Available water capacity is low. Organic matter content also is low. The shrink-swell potential and the potential for frost action are high.

Most areas are adjacent to roadways. Some are used as sites for dwellings and small commercial buildings. These soils are poorly suited to dwellings without basements, to small commercial buildings, and to lawns. They generally are unsuited to dwellings with basements and to septic tank absorption fields because of the seasonal high water table, the very slow permeability, and the shrink-swell potential. Establishing a plant cover is difficult in the fill areas along roadways and railroads and in the borrow areas.

In the areas used as sites for dwellings without basements or for small commercial buildings, the shrink-swell potential and the seasonal high water table are limitations. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. The water table can be lowered by open drainage ditches and by underground drains installed in coarse grained material around footings.

If a roadway is revegetated or a lawn seeded, the seasonal high water table, droughtiness in the summer, and the clayey surface layer are limitations. The water table can be lowered by underground drains. Providing an adequate amount of plant nutrients, planting suitable species, increasing mowing heights during the summer, and watering with sprinklers during extended dry periods help to overcome the droughtiness. Because of the clayey surface layer, the surface should be blanketed with better suited soil material.

No capability class or subclass is assigned.

prime farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in providing the Nation's short- and long-range needs for food and fiber. Because the supply of high quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to food, feed, forage, fiber, and oilseed crops. It may be cropland, pasture, woodland, or other land, but it is not urban and built-up land or water areas. It either is used for food or fiber or is available for those uses. The soil qualities, growing season, and moisture supply are those needed for a well managed soil economically to produce a sustained high yield of crops. Prime farmland produces the highest yields with minimum inputs of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland usually has an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The level of acidity or alkalinity is acceptable. Prime farmland has few or no rocks and is permeable to water and air. It is not excessively erodible or saturated with water for long periods and is not frequently flooded during the growing season. The slope ranges mainly from 0 to 5 percent. More detailed information about the criteria for prime farmland is available at local offices of the Soil Conservation Service.

About 610,000 acres in Iroquois County, or nearly 85 percent of the total acreage, meets the requirements for prime farmland. This land generally is used for crops, mainly corn and soybeans, which account for most of the local farm income each year.

A recent trend in land use in some parts of the county has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

The map units in Iroquois County that meet the requirements for prime farmland are listed in table 5. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described under the heading "Detailed soil map units."

Some map units meet the requirements for prime farmland only in areas where the soil is drained or protected from flooding. In table 5 a qualification is added in parenthesis after the name of these map units. Onsite evaluation is needed to determine whether or not a specific area of the soil is adequately drained or protected. In Iroquois County most of the naturally wet soils have been adequately drained.

use and management of the soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

crops and pasture

Roy Bailey, district conservationist, Soil Conservation Service, helped prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed soil map units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

In 1974, about 596,421 acres in Iroquois County was cultivated, 16,196 acres was pastured, and 13,550 acres was used as hayland (*11*). The soils in the county have good potential for increased production of crops, hay, and pasture grasses. This soil survey can be used as a guide to the latest management techniques that increase food and fiber production.

The chief management needs in the county are measures that control water erosion and soil blowing, drain the wetter areas, help to overcome the droughtiness of some soils, and help to maintain tilth and fertility.

Water erosion is the major hazard on about 16 percent of the cropland and pasture in the county. It is a hazard if slopes are more than 2 percent. It also is a hazard in areas where slopes are long and less than 2 percent. According to the Iroquois County Soil and Water Conservation District Long Range Plan, better erosion control is needed on about 45 percent of the cropland.

Loss of topsoil through sheet erosion reduces productivity, decreases the rate of water intake, and results in sedimentation and a deterioration of tilth. The productivity of the soil is reduced as the topsoil is eroded away and the subsoil is incorporated into a plow layer. Loss of topsoil is especially damaging on Clarence, Elliott, and Swygert soils or on soils having layers in the subsoil that limit the depth of the root zone, including layers of compact, clayey glacial till high in content of lime. Erosion also reduces the productivity of soils that tend to be droughty, such as Chelsea, Oakville, and Sparta soils.

If erosion on the more sloping soils is severe, tilth deteriorates and the rate of water intake decreases. A clayey surface layer tends to clod if worked when wet. As a result of the cloddiness, preparing a good seedbed is difficult. Because the surface tends to crust over after hard rains, the runoff rate is increased.

Sediment from uncontrolled erosion enters streams, rivers, lakes, and road ditches. Removing this sediment is expensive (fig. 19).

Measures that control erosion reduce the length of slopes or provide an adequate plant cover. Cropping systems that keep a cover of plants or crop residue on the surface during critical rainfall periods help to prevent excessive erosion and thus help to maintain the productive capacity of the soil. Including grasses and legumes in the crop rotation improves tilth and provides nitrogen for the following crop.

Terraces, diversions, contour farming, and contour stripcropping help to control erosion. They also reduce the runoff rate and increase the rate of water intake. In some areas they are not feasible because slopes are short and the topography is irregular. They are suitable on soils that have smooth, uniform slopes. In areas where they are not suitable, tillage systems or crop rotations that provide an adequate plant cover can be used to control erosion.

Figure 19.—Removing sediment that was eroded from the more sloping areas of Corwin soils and was deposited in a road ditch.

A system of conservation tillage that leaves crop residue on the surface after planting helps to prevent excessive erosion, reduces the runoff rate, and increases the rate of water intake. It is effective on most of the arable soils in the county.

Soil blowing is a hazard in some areas of Oakville, Chelsea, and Sparta soils. It can be controlled by maintaining an adequate plant cover, by leaving crop residue on the surface in winter, and by keeping the surface rough. Windbreaks of suitable trees or shrubs also are effective in controlling soil blowing.

A drainage system has been installed on most of the somewhat poorly drained and poorly drained soils in the county and in most areas of the very poorly drained Gilford and Peotone soils. As a result, these soils are sufficiently drained for the crops commonly grown in the survey area. Measures that maintain or improve the drainage system are needed in many areas. Most areas of the very poorly drained Aurelius, Granby, Houghton, and Rantoul and poorly drained Monee soils have not been sufficiently drained for the crops commonly grown in the county.

The design of surface and subsurface drainage systems varies with the kind of soil. A combination of surface drains and tile drains is needed in most areas of the poorly drained and very poorly drained soils that are intensively row cropped. Unless they are closely spaced, tile drains do not function well in many of the soils in the county. If an adequate outlet is available, they function well in Ashkum, Elliott, Martinton, Milford, and other soils that have a moderately or moderately slowly permeable subsoil. They generally are not effective, however, in slowly or very slowly permeable soils, such as Bryce, Clarence, Rantoul, Rowe, and Swygert soils. On these soils surface inlets and open drainage ditches help to remove surface water and control ponding.

Droughtiness limits yields on some of the soils used for crops and pasture in the county. Oakville and Sparta soils, for example, are so porous that they are unable to store the water necessary to maintain adequate plant growth. Other soils, such as Clarence and Nappanee soils, have layers that plant roots cannot easily penetrate. These soils dry out quickly, and moisture stress is soon evident during hot, windy days. Many of the wet, clayey soils have similar limitations. Rantoul and Rowe soils hold a large amount of water, but the water generally is not readily available to plant roots because it is tightly held in a film surrounding clay particles.

Droughtiness can be minimized by increasing the rate of water intake, reducing the runoff rate, or planting

crops that are drought tolerant. Cover crops and a system of conservation tillage that leaves crop residue on the surface after planting increase the rate of water intake and reduce the runoff rate. Droughty soils generally are better suited to soybeans and grain sorghum than to corn. They also are better suited to winter wheat, which matures in the spring, before summer drought reduces the water supply.

Soil fertility is naturally high in most soils in the county. Most of the soils are slightly acid to mildly alkaline. Some that formed in material deposited by water or wind are naturally acid. Examples are Chelsea, Oakville, and Sparta soils. Some light colored soils that formed in clayey material are acid in the upper part but are moderately alkaline in the substratum. Before maximum plant growth can be achieved on most acid soils, applications of limestone are needed to maintain or raise the pH level.

Most of the soils in the county have a naturally high supply of nitrogen. Exceptions are soils having a light colored surface layer, such as Chatsworth, Chelsea, Del Rey, Martinsville, Morocco, Nappanee, Oakville, and Roby soils. Some crops, particularly corn and wheat, respond well to applications of nitrogen fertilizer. Planting legumes, which take nitrogen from the air and fix it in the soil, and adding livestock waste help to replenish the nitrogen supply.

Additions of lime, nitrogen, phosphorus, potassium, or any other elements needed for optimum yields should be based on the results of soil tests. The Cooperative Extension Service can help in determining the kinds and amounts of fertilizer and lime needed.

Soil tilth is an important factor affecting the germination of seeds, the amount of runoff, and the intake of water into the soil. Good tilth is common in granular and porous soils. Poor tilth is a problem in the dark, clayey Ashkum, Bryce, Milford, Peotone, Rantoul, and Rowe soils. These soils often stay wet until late in spring. If plowed when wet, they tend to be very cloddy. As a result, preparing a good seedbed is difficult. Chisel tillage in the fall on these nearly level soils results in good tilth in the spring.

The field crops suited to the soils and climate of the survey area include many that are not commonly grown. Soybeans and corn are the main crops. Asparagus, kidney beans, navy beans, pumpkins, strawberries, sweet corn, sweet potatoes, and white potatoes are grown in some areas. The yields of these crops vary. Nursery stock is grown in a few areas. Grain sorghum, green beans, lima beans, and sunflowers can be grown on some of the soils. Blueberries can be grown on the acid, sandy soils, but intensive management is needed.

Of the counties in Illinois, Iroquois County ranks second in the value of farm products sold (*11*). The climatic conditions and the soils are particularly well suited not only to field crops but also to vegetables and specialty crops.

yields per acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered (*4*).

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that insures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils.

land capability classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor does it consider possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit (*9*). Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and

narrower choices for practical use. The classes are defined as follows:

Class I soils have slight limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion uless close-growing plant cover is maintained; *w* shows that water in or on the surface interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

The capability classification of each map unit is given in the section "Detailed soil map units."

woodland management and productivity

Hardwood forest originally covered only a small part of Iroquois County. About 13,251 acres was woodland in 1974 (*11*). This total includes the acreage in state forests and parks. Most of the woodland occurs as areas of associations 1, 2, 5, 6, 7, and 10, which are described under the heading "General soil map units."

After settlement, most of the trees were cleared from the soils suitable for cultivated crops. As a result, much of the remaining woodland occurs as soils that are unsuitable for cultivation, commonly because they are too steep or too wet or are in isolated areas. The wooded soils have fair to good potential for trees of high quality if the best suited species are selected for planting and the woodland is well managed

Unless tree growth is significantly limited by soil properties, the most commonly planted desirable trees are black walnut, eastern white pine, green ash, northern red oak, white ash, white oak, and sugar maple on the well drained and moderately well drained upland soils; American sycamore, eastern cottonwood, eastern white pine, green ash, northern red oak, and white oak on the somewhat poorly drained soils; and American sycamore, common hackberry, eastern cottonwood, European larch, green ash, pin oak, red maple, and swamp white oak on the poorly drained and very poorly drained soils that are subject to flooding or ponding.

In some areas soil properties substantially limit tree growth. In these areas the most commonly planted desirable trees are eastern white pine, green ash, jack pine, and red pine if the soils are sandy and somewhat excessively drained or excessively drained; eastern redcedar and jack pine if the soils are somewhat poorly drained and are shallow to a clayey subsoil; and green ash and northern white-cedar if the soils are poorly drained or very poorly drained and have a clayey subsoil that restricts root penetration.

Much of the commercial woodland can be improved by harvesting mature trees and by removing the nonmerchantable trees that retard the growth of desirable species. Measures that prevent fires and exclude grazing livestock are needed. Tree planting is needed unless stocking is adequate. Control of competing vegetation is needed if seedlings are planted. A grass cover between rows of the seedlings planted in the more sloping bare areas helps to control erosion. If erosion is excessive or the slope is more than 15 percent, runoff should be diverted away from haul roads and skid trails. Machinery can be used only if the soil is firm enough to support the weight. A surface drainage system is needed on the wet soils.

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops Only those soils suitable for wood crops are listed. The table lists the ordination (woodland suitability) symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *w* indicates excessive water in or on the soil; *c*, clay in the upper part of the soil; and *s*, sandy texture. The letter *o* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: w, c, and s.

In table 7, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Ratings of *windthrow hazard* are based on the soil characteristics that affect the development of tree roots and the ability of the soil to hold trees firmly. A rating of *slight* indicates that a few trees may be blown down by normal winds; *moderate*, that some trees will be blown down during periods of excessive soil wetness and strong winds; and *severe*, that many trees are blown down during periods of excessive soil wetness and moderate or strong winds.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suited to the soils and to commercial wood production.

windbreaks and environmental plantings

Windbreaks protect livestock, buildings, and yards from wind and snow. They also protect fruit trees and gardens, and they furnish habitat for wildlife. Several rows of low- and high-growing broadleaf and coniferous trees and shrubs provide the most protection.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil. Field windbreaks protect cropland and crops from wind, keep snow from blowing off the fields, and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. To insure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Table 8 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in table 8 are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from local offices of the Soil Conservation Service or the Cooperative Extension Service or from a nursery.

recreation

The demand for land and facilities for boating, swimming, picnicking, fishing, hunting, hiking, camping, and other forms of outdoor recreation is increasing throughout the county. Facilities for these activities are available on a few privately owned tracts.

The potential for further recreational development is favorable throughout the county. The soils having the best potential are along the Iroquois River and its major tributaries. These soils are in areas where a hilly terrain, wooded slopes, and numerous streams provide a variety of opportunities for recreation.

The soils of the survey area are rated in table 9 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 9, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are

minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 12 and interpretations for dwellings without basements and for local roads and streets in table 11.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking, horseback riding, and bicycling should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

wildlife habitat

Areas used as wildlife habitat are not necessarily set aside for this purpose. Wildlife habitat commonly is a secondary use in areas used for other purposes, such as farming (fig. 20). For example, the many nearly level soils used for crops and pasture in Iroquois County generally are moderately suited or well suited to openland wildlife habitat.

Figure 20.—An area of Wea soils used for asparagus. This area provides excellent cover for wildlife.

Figure 21.—Hawthorn on Chelsea soils. The shrubs provide excellent cover for openland wildlife.

The woodland habitat in the county generally is restricted to the areas along streams. These areas provide habitat for woodland wildlife, including wood ducks and other wildlife having special habitat requirments. Woodland borders dominated by shrubs provide excellent habitat for many wildlife species (fig. 21).

Good management can improve the habitat for wildlife. Keeping crop residue on the surface during fall and winter for example, not only helps to control erosion but also greatly improves wildlife habitat in cropped areas. Deferred mowing of grassed waterways, roadsides, and fence rows until early in August, after the nesting season, can significantly increase the annual production of pheasants, meadowlarks, rabbits, and other kinds of wildlife that nest on the ground. Measures that exclude livestock from woodland, wetland, and streambanks markedly improve the habitat. The livestock should be excuded from all areas, except for those that provide restricted access to drinking water.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 10, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or

maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and soybeans.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, switchgrass, and indiangrass.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, cherry, walnut, ash, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, gray dogwood, and crabapple.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, pondweed, cattail, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, swamps, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite, pheasant, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include tree sparrows, nuthatches, thrushes, woodpeckers, squirrels, fox, raccoon, and deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

building site development

Table 11 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

sanitary facilities

Table 12 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons,

and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 12 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 12 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 12 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the

surface layer should be stockpiled for use as the final cover.

construction materials

Table 13 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 13, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

water management

Table 14 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site

features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, toxic substances, such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

soil properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

engineering index properties

Table 15 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil series and their morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 or 20 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (*1*).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as Pt. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The

estimates are based on test data from the survey area or from nearby areas and on field examination.

physical and chemical properties

Table 16 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

In table 16, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity,

infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

soil and water features

Table 17 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt and water in swamps and marshes are not considered flooding.

Table 17 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it occurs on an average of more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered is local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 17 are the depth to the seasonal high water table; the kind of water table—that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 17.

An apparent water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. An artesian water table is under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. A perched water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave

and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or*high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

classification of the soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*10*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. In table 18, the soils of the survey area are classified according to the system. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Mollisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquoll (*Aqu*, meaning water, plus *oll*, from Mollisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Haplaquolls (*Hapl*, meaning minimal horizonation, plus *aquoll*, the suborder of the Mollisols that have an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Haplaquolls.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, mesic Typic Haplaquolls.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

soil series and their morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual* (*8*). Many of the technical terms used in the descriptions are defined in *Soil Taxonomy* (*10*). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed soil map units."

Allison series

The Allison series consists of deep, well drained, moderately permeable soils on flood plains. These soils formed in silty alluvial material. Slopes range from 0 to 3 percent.

Allison soils commonly are adjacent to the poorly drained Comfrey and Sawmill soils and the somewhat poorly drained Tice soils. They are higher on the landscape than the adjacent soils.

Typical pedon of Allison silty clay loam, 0 to 3 percent slopes, 440 feet west and 900 feet north of the southeast corner of sec. 5, T. 26 N., R. 12 W.

A1—0 to 12 inches; very dark grayish brown (10YR 3/2) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate fine granular structure; friable; many fine roots; neutral; gradual smooth boundary.

A3—12 to 20 inches; very dark grayish brown (10YR 3/2) silty clay loam, brown (10YR 5/3) dry; moderate medium granular structure; friable; many fine roots; neutral; gradual smooth boundary.

B21—20 to 30 inches; dark brown (10YR 3/3) silty clay loam, brown (10YR 5/3) dry; moderate fine prismatic structure parting to moderate fine subangular blocky; firm; many fine roots; many thin very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; gradual smooth boundary.

B22—30 to 42 inches; dark brown (10YR 3/3) silty clay loam, brown (10YR 5/3) dry; moderate medium prismatic structure parting to moderate fine subangular blocky; firm; common fine roots; common thin very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; gradual smooth boundary.

B23—42 to 48 inches; dark brown (10YR 3/3) silty clay loam, brown (10YR 5/3) dry; weak medium prismatic structure parting to weak medium subangular blocky; firm; common fine roots; common thin very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; gradual smooth boundary.

B3—48 to 60 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak medium prismatic structure; friable; few fine roots; common thin dark brown (10YR 4/3) organic coatings on faces of peds; mildly alkaline; slight effervescence.

The thickness of the solum ranges from 30 to more than 60 inches. The thickness of the mollic epipedon ranges from 24 to 60 inches. The content of clay in the control section ranges from 27 to 35 percent. Reaction ranges from slightly acid to mildly alkaline throughout the profile.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 through 3. It is dominantly silty clay loam, but the range includes silt loam. The B2 horizon has hue of 10YR or 7.5YR and value and chroma of 2 through 4. It is dominantly silty clay loam but in some pedons has thin strata of silt loam, loam, clay loam, or sandy loam below a depth of 30 inches. The C horizon is dominantly silty clay loam that commonly is stratified with thin layers of fine sand to silt loam.

Alvin series

The Alvin series consists of deep, well drained soils on outwash plains in the uplands. These soils formed in loamy and sandy glacial outwash. They are moderately permeable in the subsoil and moderately rapidly permeable in the substratum. Slopes range from 1 to 5 percent.

Alvin soils are similar to Onarga soils and commonly are adjacent to Chelsea, Roby, and Selma soils. The excessively drained Chelsea soils are higher on the landscape than the Alvin soils. Onarga soils have a mollic epipedon. The somewhat poorly drained Roby soils are lower on the landscape than the Alvin soils. The poorly drained Selma soils are in shallow depressions and drainageways. They have a mollic epipedon. Their subsoil contains more clay than that of the Alvin soils.

Typical pedon of Alvin fine sandy loam, 1 to 5 percent slopes, 3,015 feet south and 2,589 feet east of the northwest corner of sec. 4, T. 25 N., R. 12 W.

Ap—0 to 8 inches; brown (10YR 4/3) fine sandy loam, pale brown (10YR 6/3) dry; weak very fine granular structure; very friable; many fine roots; slightly acid; abrupt smooth boundary.

B1t—8 to 14 inches; brown (7.5YR 4/4) fine sandy loam; moderate fine and medium subangular blocky structure; friable; many fine roots; many thin brown (10YR 4/3) clay films on faces of peds; medium acid; clear smooth boundary.

B21t—14 to 23 inches; brown (7.5YR 4/4) fine sandy loam; weak medium prismatic structure parting to weak medium subangular blocky; friable; many fine roots; many thin brown (10YR 4/3) clay films on faces of peds; strongly acid; clear smooth boundary.

B22t—23 to 34 inches; brown (7.5YR 4/4) fine sandy loam; weak medium prismatic structure parting to weak medium and coarse subangular blocky; friable; common fine roots; many thin brown (10YR 4/3) clay films on faces of peds; strongly acid; clear smooth boundary.

B3—34 to 45 inches; yellowish brown (10YR 5/6) fine sandy loam stratified with thin layers of loam; weak coarse prismatic structure parting to weak coarse subangular blocky; friable; few fine roots; many fine dark concretions (iron and manganese oxide); strongly acid; abrupt smooth boundary.

C—45 to 60 inches; brown (10YR 5/3) loamy sand; single grained; loose; medium acid.

The thickness of the solum ranges from 40 to 60 inches. In the control section, the content of clay is 15 to 18 percent and the content of sand ranges from 45 to 70 percent.

The Ap horizon has value of 4 and chroma of 2 or 3. The pedons in uncultivated areas have an A1 horizon that is less than 6 inches thick. This horizon has hue of 10YR, value of 3, and chroma of 1 or 2. Some pedons have a yellowish brown (10YR 5/4) A2 horizon. The A horizon is dominantly fine sandy loam, but the range

includes very fine sandy loam, sandy loam, and loamy sand. The B2 horizon has hue of 10YR or 7.5YR and value and chroma of 4 through 6. It is dominantly fine sandy loam but in some pedons is very fine sandy loam, loam, or sandy loam or has thin layers of sandy clay loam and clay loam. It is medium acid to very strongly acid. The C horizon is dominantly loamy sand, but the range includes sandy loam, sand, and the fine and very fine analogs of these textures.

Andres series

The Andres series consists of deep, somewhat poorly drained soils on uplands. These soils formed in loamy outwash and silty glacial till or lacustrine sediments. They are moderately permeable in the subsoil and moderately slowly permeable in the substratum. Slopes range from 0 to 2 percent.

Andres soils are similar to Elliott, Lisbon, Martinton, and Mokena soils and commonly are adjacent to Elliott, Lisbon, Martinton, and Milford soils. Elliott, Lisbon, Martinton, and Mokena soils are in positions on the landscape similar to those of the Andres soils. The subsoil of Elliott, Martinton, and Milford soils contains more clay than that of the Andres soils, and the subsoil of Lisbon soils contains less sand. The poorly drained Milford soils are in shallow depressions and drainageways. Mokena soils contain more clay in the lower part of the subsoil and in the substratum than the Andres soils.

Typical pedon of Andres loam, 2,517 feet south and 143 feet east of the northwest corner of sec. 4, T. 28 N., R. 14 W.

Ap—0 to 11 inches; very dark gray (10YR 3/1) loam, grayish brown (10YR 5/2) dry; weak very fine granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

B1t—11 to 15 inches; dark brown (10YR 4/3) silty clay loam; common fine faint dark gray (10YR 4/1) and few fine faint yellowish brown (10YR 5/6) mottles; moderate very fine and fine subangular blocky structure; friable; many fine roots; many thin dark brown (10YR 3/3) clay films on faces of peds; common fine black (N 2/0) accumulations (iron and manganese oxide); slightly acid; clear smooth boundary.

B21t—15 to 24 inches; dark yellowish brown (10YR 4/4) clay loam; few fine faint dark grayish brown (10YR 4/2) and yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate fine and medium subangular blocky; friable; common fine roots; common thin dark grayish brown (10YR 4/2) and many thin dark brown (10YR 3/3) clay films on faces of peds; neutral; clear smooth boundary.

IIB22t—24 to 28 inches; brown (10YR 4/3) silty clay loam; many fine faint gray (10YR 5/1) and yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; firm; common fine roots; many thin dark grayish brown (10YR 4/2) clay films on faces of peds; weak effervescence; mildly alkaline; abrupt smooth boundary.

IIB31t—28 to 34 inches; dark yellowish brown (10YR 4/4) silty clay loam; many fine faint gray (10YR 5/1) and few medium distinct strong brown (7.5YR 5/6) mottles; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; firm; few fine roots; many thin dark gray (10YR 4/1) clay films on faces of peds; mildly alkaline; strong effervescence; clear smooth boundary.

IIB32t—34 to 39 inches; brown (10YR 5/3) silty clay loam; many fine faint gray (10YR 5/1) and few medium distinct strong brown (7.5YR 5/6) mottles; weak medium prismatic structure; firm; few fine roots; common thin gray (10YR 5/1) clay films on faces of peds; strong effervescence; mildly alkaline; clear smooth boundary.

IIC—39 to 60 inches; brown (10YR 5/3) silty clay loam; common fine gray (10YR 5/1) and few medium distinct strong brown (7.5YR 5/6) mottles; massive; firm; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 36 to 60 inches. The thickness of the mollic epipedon ranges from 10 to 23 inches.

The A horizon has value of 2 or 3 and chroma of 1 or 2. It is dominantly loam, but the range includes silt loam and silty clay loam. The B2 horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 2 through 4. It is medium acid to neutral in the upper part and neutral to mildly alkaline in the lower part. It is clay loam, silty clay loam, or sandy clay loam in the upper part and silt loam or silty clay loam in the lower part. The content of clay in the control section ranges from 27 to 35 percent. The C horizon is silty clay loam or silt loam. It is mildly alkaline or moderately alkaline and has free carbonates.

Ashkum series

The Ashkum series consists of deep, poorly drained, moderately slowly permeable soils on uplands. These soils formed in loess or silty material and the underlying silty clay loam glacial till. Slopes range from 0 to 2 percent.

Ashkum soils are similar to Milford and Reddick soils and commonly are adjacent to Andres, Elliott, Rantoul, Reddick, and Varna soils. Andres, Elliott, and Varna soils have an argillic horizon. They are higher on the landscape than the Ashkum soils and are better drained. Milford soils are stratified in the lower part of the solum.

The very poorly drained Rantoul soils are in depressions below the Ashkum soils. Reddick soils are in positions on the landscape similar to those of the Ashkum soils. The upper part of their subsoil contains less clay than that of the Ashkum soils.

Typical pedon of Ashkum silty clay loam, 2,220 feet south and 560 feet west of the northeast corner of sec. 34, T. 29 N., R. 14 W.

Ap—0 to 9 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak fine and very fine granular structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

A12—9 to 12 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak very fine subangular blocky structure parting to moderate fine granular; friable; many fine roots; slightly acid; clear smooth boundary.

B1—12 to 16 inches; grayish brown (10YR 5/2) silty clay loam; common fine faint dark yellowish brown (10YR 4/4) mottles; weak very fine subangular blocky structure; firm; common fine roots; many very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; clear smooth boundary.

IIB21g—16 to 21 inches; olive (5Y 5/3) silty clay loam; common fine distinct yellowish brown (10YR 5/4) mottles; moderate fine prismatic structure parting to moderate fine subangular blocky; firm; common fine roots; many very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; clear smooth boundary.

IIB22g—21 to 30 inches; olive (5Y 5/3) silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate fine subangular blocky; firm; common fine roots; common very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; clear smooth boundary.

IIB31g—30 to 39 inches; gray (5Y 5/1) silty clay loam; common fine distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to weak medium subangular blocky; very firm; few fine roots; common dark gray (10YR 4/1) coatings on faces of peds; many fine dark concretions (iron and manganese oxide); strong effervescence; moderately alkaline; gradual wavy boundary.

IIB32g—39 to 50 inches; gray (5Y 5/1) silty clay loam; common medium distinct light olive brown (2.5Y 5/4) mottles; moderate medium prismatic structure; very firm; few fine roots; strong effervescence; moderately alkaline; gradual wavy boundary.

IIC—50 to 60 inches; gray (5Y 5/1) silty clay loam; common medium distinct light olive brown (2.5Y 5/4) mottles; massive; very firm; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 30 to 60 inches. The depth to free carbonates commonly is less than the thickness of the solum. The thickness of the mollic epipedon ranges from 10 to 24 inches.

The A horizon has value of 2 or 3 and chroma of 1 or less. It is dominantly silty clay loam, but the range includes silty clay. The B2 horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 through 6, and chroma of 3 or less. It is slightly acid to moderately alkaline. The pH commonly increases with increasing depth. This horizon is dominantly silty clay loam, but the range includes silty clay. The content of clay in the control section ranges from 35 to 42 percent.

Aurelius series

The Aurelius series consists of deep, very poorly drained soils in upland depressions. These soils formed in highly decomposed herbaceous organic material underlain by loamy or sandy material. They are moderately slowly permeable in the organic material and rapidly permeable in the substratum. Slopes are less than 2 percent.

Aurelius soils are similar to Houghton soils and commonly are adjacent to Gilford, Granby, Houghton, and Selma soils. Gilford and Granby soils and the poorly drained Selma soils are slightly higher on the landscape than the Aurelius soils. They are mineral soils. Houghton soils are lower on the landscape than the Aurelius soils. Also, they formed in a thicker layer of herbaceous organic material.

Typical pedon of Aurelius muck, 161 feet south and 1,335 feet west of the northeast corner of sec. 31, T. 28 N., R. 12 W.

Oap—0 to 9 inches; black (N 2/0), broken face and rubbed, sapric material; about 5 percent fiber, a trace rubbed; weak medium angular blocky structure; nonsticky; many fine roots; neutral; abrupt smooth boundary.

Oa2—9 to 14 inches; black (N 2/0), broken face and rubbed, sapric material; about 5 percent fiber, a trace rubbed; moderate fine subangular blocky structure; nonsticky; many fine roots; neutral; clear smooth boundary.

IILco—14 to 20 inches; very dark grayish brown (10YR 3/2) coprogenous earth; weak medium subangular blocky structure; nonsticky; mildly alkaline; clear smooth boundary.

IIILca1—20 to 25 inches; grayish brown (10YR 5/2) marl; weak medium platy structure; nonsticky; few fine roots; violent effervescence; mildly alkaline; clear smooth boundary.

IIILca2—25 to 30 inches; gray (5Y 5/1) marl; weak medium platy structure; nonsticky; few fine roots; strong effervescence; mildly alkaline; gradual wavy boundary.

IVLco—30 to 38 inches; very dark gray (5Y 3/1) coprogenous earth; massive; nonsticky; strong effervescence; mildly alkaline; clear smooth boundary.

VCg—38 to 60 inches; mottled gray (5Y 5/1) and olive (5Y 5/3) very fine sand; single grained; loose; strong effervescence; mildly alkaline.

The depth to the sandy or loamy material ranges from 24 to 40 inches. The Oa horizon has hue of 10YR or 5YR or is neutral in hue. It has value of 2 and chroma of 0 through 2. It ranges from slightly acid to moderately alkaline. The IILco horizon has hue of 5YR through 5G, value of 2 through 4, and chroma of 1 or 2. It ranges from neutral to moderately alkaline. The IIILca and IVLco horizons have hue of 10YR, 2.5Y, or 5Y or are neutral in hue. They have value of 5 through 8 and chroma of 2 or less. The VCg horizon is dominantly very fine sand, but the range includes sandy loam, fine sandy loam, loam, silt loam, and clay loam.

Barrington series

The Barrington series consists of deep, moderately well drained, moderately permeable soils on glacial outwash plains. These soils formed in loess or silty material and in the underlying loamy glacial outwash. Slopes range from 1 to 3 percent.

Barrington soils are similar to Harco and Jasper soils and commonly are adjacent to those soils and to La Hogue, Pella, and Selma soils. The somewhat poorly drained Harco and La Hogue soils have a slope of 0 to 2 percent. The solum of Jasper, La Hogue, and Selma soils contains more sand than that of the Barrington soils. Jasper soils are in positions on the landscape similar to those of the Barrington soils. The poorly drained Pella and Selma soils are in shallow depressions and drainageways.

Typical pedon of Barrington silt loam, 1 to 3 percent slopes, 100 feet north and 75 feet east of the southwest corner of sec. 11, T. 26 N., R. 11 W.

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate very fine granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

A12—10 to 14 inches; dark brown (10YR 3/3) silt loam, dark brown (10YR 4/3) dry; moderate very fine granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

B1t—14 to 17 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak very fine subangular blocky structure parting to weak very fine granular; friable; many fine roots; common dark brown (10YR 3/3) clay films on faces of peds; medium acid; clear smooth boundary.

B21t—17 to 22 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak fine subangular blocky structure; firm; common fine roots; common thin dark brown (10YR 4/3) clay films on faces of peds; medium acid; clear smooth boundary.

B22t—22 to 26 inches; yellowish brown (10YR 5/6) silty clay loam; common fine faint brown (10YR 5/3) mottles; moderate very fine and fine subangular blocky structure; firm; common fine roots; many thin dark brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

IIB3t—26 to 30 inches; yellowish brown (10YR 5/6) clay loam; many fine faint brown (10YR 5/3) mottles; weak medium subangular blocky structure; firm; common fine roots; few thin brown (10YR 5/3) clay films on faces of peds; slightly acid; clear smooth boundary.

IIC1—30 to 33 inches; yellowish brown (10YR 5/6) clay loam; many fine faint grayish brown (10YR 5/2) mottles; massive; firm; few very fine dark concretions (iron and manganese oxide); neutral; abrupt smooth boundary.

IIC2—33 to 34 inches; dark grayish brown (10YR 4/2) gravelly clay loam; massive; friable; mildly alkaline; abrupt smooth boundary.

IIC3—34 to 38 inches; mottled yellowish brown (10YR 5/6), brown (10YR 5/3), and grayish brown (10YR 5/2) stratified fine sandy loam and silty clay loam; massive; friable; slight effervescence; mildly alkaline; clear smooth boundary.

IIC4—38 to 60 inches; mottled yellowish brown (10YR 5/6), dark grayish brown (10YR 4/2), and brown (10YR 5/3) stratified fine sandy loam, silt loam, and silty clay loam; massive; friable; strong effervescence; mildly alkaline.

The thickness of the solum ranges from 25 to 45 inches. The depth to free carbonates ranges from 20 to 40 inches. The thickness of the mollic epipedon ranges from 10 to 14 inches.

The A horizon has value of 2 or 3 and chroma of 1 through 3. The B2 horizon ranges from medium acid to mildly alkaline. It has hue of 10YR, value of 4 through 6, and chroma of 3 through 6. In some pedons the lower part of this horizon and the IIB3 horizon have mottles with chroma of 2 or less. The IIB3 horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 3 through 6. It is stratified silt loam, sandy loam, very fine sandy loam, loam, or clay loam. It ranges from slightly acid to moderately alkaline and has free carbonates in some pedons. The C horizon is stratified silty clay loam to very find sand and the gravelly analogs of these textures.

Bryce series

The Bryce series consists of deep, poorly drained, slowly permeable soils on uplands. These soils formed in clayey lacustrine sediments and the underlying silty clay glacial till. Slopes range from 0 to 2 percent.

Bryce soils are similar to Milford, Rowe, and Swygert soils and commonly are adjacent to Milford, Nappanee, Rantoul, and Swygert soils. Milford soils are in positions on the landscape similar to those of the Bryce soils. Their solum contains less clay than that of the Bryce soils. The somewhat poorly drained Nappanee and Swygert soils are higher on the landscape than the Bryce soils. Also, Nappanee soils lack a mollic epipedon. Rantoul soils are in depressions. Their mollic epipedon is more than 24 inches thick. Rowe soils have an argillic horizon. Their positions on the landscape are similar to those of the Bryce soils.

Typical pedon of Bryce silty clay, 2,559 feet north and 45 feet west of the center of sec. 7, T. 25 N., R. 13 W.

Ap1—0 to 10 inches; black (10YR 2/1) silty clay, dark gray (10YR 4/1) dry; weak very fine granular structure; friable; many roots; few fine dark accumulations (iron and manganese oxide); slightly acid; abrupt smooth boundary.

Ap2—10 to 13 inches; black (10YR 2/1) silty clay, dark gray (10YR 4/1) dry; moderate medium angular blocky structure; friable; many fine roots; medium acid; abrupt smooth boundary.

B21—13 to 19 inches; black (10YR 2/1) silty clay, dark gray (10YR 4/1) dry; common fine faint dark grayish brown (2.5Y 4/2) and few fine distinct grayish brown (10YR 5/2) mottles; moderate fine and medium subangular blocky structure; friable; common fine roots; continuous black (10YR 2/1) organic coatings on faces of peds; neutral; clear wavy boundary.

B22tg—19 to 24 inches; dark grayish brown (2.5Y 4/2) silty clay; common fine prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate fine and medium subangular blocky; firm; few fine roots; continuous dark gray (10YR 4/1) clay films and black (N 2/0) organic coatings on faces of peds; neutral; clear wavy boundary.

B23tg—24 to 35 inches; olive gray (5Y 5/2) silty clay; common fine distinct dark gray (2.5Y 4/1) and common fine prominent strong brown (7.5YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; continuous olive gray (5Y 4/2) clay films and very dark gray (10YR 3/1) organic coatings on faces of peds; common fine dark accumulations (iron and manganese oxide); few slickensides; neutral; gradual smooth boundary.

B31tg—35 to 45 inches; gray (5Y 5/1) silty clay; common medium distinct light olive brown (2.5Y 5/4) and few medium prominent dark yellowish brown (10YR 4/4) mottles; weak coarse prismatic structure parting to weak coarse subangular blocky; firm; few fine roots; continuous dark gray (5Y 4/1) clay films on faces of peds; few slickensides and pressure faces; mildly alkaline; clear smooth boundary.

IIB32g—45 to 60 inches; gray (5Y 5/1) silty clay; common coarse prominent dark brown (10YR 4/3) and common medium prominent yellowish brown (10YR 5/6) mottles; weak very coarse prismatic structure; very firm; few fine white accumulations and concretions of calcium carbonate; slight effervescence; moderately alkaline.

The thickness of the solum ranges from 30 to 60 inches. The thickness of the mollic epipedon ranges from 10 to 24 inches.

The A horizon has value of 2 or 3 and chroma of 2 or less. It is dominantly silty clay, but the range includes silty clay loam. The B2 horizon has hue of 10YR, 2.5Y, or 5Y, value of 2 through 6, and chroma of 3 or less. It ranges from neutral to moderately alkaline. It is dominantly silty clay, but the range includes clay. The content of clay in the control section ranges from 42 to 48 percent. The C horizon is silty clay, silty clay loam, or clay.

Chatsworth series

The Chatsworth series consists of deep, moderately well drained, very slowly permeable soils on uplands. These soils formed in silty clay or silty clay loam glacial till or lakebed sediments. Slopes range from 4 to 20 percent.

Chatsworth soils are similar to St. Clair soils and commonly are adjacent to Clarence, Elliott, Nappanee, and Swygert soils. The adjacent soils are on shoulder slopes above the Chatsworth soils and are somewhat poorly drained. Also, Clarence, Elliott and Swygert soils have a mollic epipedon. St. Clair soils are in similar positions on the landscape or are in slightly higher positions than the Chatsworth soils. Also, they are deeper to carbonates.

Typical pedon of Chatsworth silty clay, 4 to 10 percent slopes, 148 feet north and 1,870 feet west of the southeast corner of sec. 7, T. 24 N., R. 10 E.

A1—0 to 2 inches; dark grayish brown (2.5Y 4/2) silty clay, light brownish gray (10YR 6/2) dry; moderate medium granular structure; firm; common medium grass roots; slight effervescence; mildly alkaline; abrupt smooth boundary.

B2—2 to 11 inches; dark grayish brown (2.5Y 4/2) silty clay; common fine distinct dark gray (5Y 4/1) and few fine faint olive brown (2.5Y 4/4) mottles; moderate very fine and fine subangular blocky structure; firm; few medium and fine grass roots; few soft white accumulations of calcium carbonate; strong effervescence; moderately alkaline; clear wavy boundary.

B31—11 to 15 inches; dark grayish brown (2.5Y 4/2) silty clay; common fine distinct dark gray (5Y 4/1) and common fine faint olive brown (2.5Y 4/4) mottles; weak medium prismatic structure parting to moderate fine and medium angular blocky; very firm; few fine grass roots, mostly in the spaces between peds; common thin dark gray (5Y 4/1) coatings on faces of peds; common soft white accumulations of calcium carbonate more than 2 millimeters in diameter; strong effervescence; moderately alkaline; gradual wavy boundary.

B32—15 to 22 inches; grayish brown (2.5Y 5/2) silty clay; common fine distinct dark gray (5Y 4/1) and common fine faint olive brown (2.5Y 4/4) mottles; moderate medium prismatic structure parting to weak medium subangular blocky; very firm; few fine grass roots in the spaces along the vertical faces of the prisms; continuous thin dark gray (5Y 4/1) coatings on faces of peds; common white accumulations of calcium carbonate more than 2 millimeters in diameter; strong effervescence; moderately alkaline; gradual wavy boundary.

C1—22 to 35 inches; dark grayish brown (2.5Y 4/2) silty clay; many fine distinct gray (5Y 5/1) and many medium distinct yellowish brown (10YR 5/6) mottles; few vertical cleavage planes or very coarse blocky or prismatic structure; very firm; few fine grass roots in the cleavage planes; many thin gray (5Y 5/1) coatings on faces along the cleavage planes; few soft white accumulations of calcium carbonate more than 2 millimeters in diameter concentrated in the cleavages; strong effervescence; moderately alkaline; gradual wavy boundary.

C2—35 to 60 inches; dark gray (5Y 4/1) silty clay; many fine faint gray (5Y 5/1) and many medium prominent yellowish brown (10YR 5/6) mottles; massive; very firm; very few fine grass roots in widely spaced cleavage planes; many thin gray (5Y 5/1) coatings on the faces along cleavage planes; few white accumulations of calcium carbonate along cleavage planes; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 10 to 24 inches. It commonly is more than the depth to free carbonates, which ranges from 0 to 20 inches.

The A1 or Ap horizon has hue of 10YR, 2.5Y, or 5Y, value of 3 or 4, and chroma of 1 or 2. It is dominantly silty clay, but the range includes silt loam and silty clay loam. The B2 horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 or 5, and chroma of 2 or 3. It is dominantly silty clay but in some pedons is silty clay loam or clay. It commonly is mildly alkaline, but in some pedons it is neutral or slightly acid. In some pedons it does not have free carbonates. In some it has clay films. Some pedons have a IIB2 horizon rather than a B2 horizon. The C horizon is dominantly silty clay but in some pedons is silty clay loam or clay. It is mildly alkaline or moderately alkaline and is calcareous.

Chelsea series

The Chelsea series consists of deep, excessively drained, rapidly permeable soils on outwash plains, lake plains, and glacial till plains. These soils formed in wind-deposited sand or water-deposited sand reworked by wind. Slopes range from 1 to 12 percent.

Chelsea soils are similar to Sparta soils and commonly are adjacent to Alvin, Morocco, and Roby soils. The well drained Alvin and somewhat poorly drained Morocco and Roby soils are lower on the landscape than the Chelsea soils. Also, Alvin and Roby soils contain more clay in the solum. Sparta soils have a mollic epipedon. Their positions on the landscape are similar to those of the Chelsea soils.

Typical pedon of Chelsea fine sand, 1 to 5 percent slopes, 19 feet north and 208 feet west of the southeast corner of sec. 16, T. 26 N., R. 12 W.

Ap—0 to 8 inches; dark brown (10YR 4/3) fine sand, brown (10YR 5/3) dry; weak fine granular structure; very friable; many fine roots; slightly acid; abrupt smooth boundary.

A21—8 to 16 inches; dark yellowish brown (10YR 4/4) fine sand; single grained; loose; common fine roots; medium acid; clear smooth boundary.

A22—16 to 27 inches; yellowish brown (10YR 5/4) fine sand; single grained; loose; common fine roots; slightly acid; clear smooth boundary.

A23—27 to 41 inches; yellowish brown (10YR 5/4) fine sand; single grained; loose; few fine roots; a 1/4-inch dark yellowish brown (10YR 4/4) band at 30 inches; slightly acid; abrupt smooth boundary.

A&B—41 to 60 inches; dark yellowish brown (10YR 4/4) fine sand (A2); single grained; very friable; brown (7.5YR 4/4) loamy fine sand bands (B2) 1/2 inch to 2 inches thick at 41, 45, and 58 inches; medium acid.

The thickness of the solum ranges from 48 to more than 60 inches. The A1 or Ap horizon has value of 3 or 4 and chroma of 2 or 3. It is dominantly fine sand, but the range includes loamy fine sand. The A2 horizon ranges from slightly acid to strongly acid. It has value of 4 or 5 and chroma of 2 through 4. The lamellae are 1/4 inch to 2 inches thick. They total 6 inches in thickness within a depth of 60 inches. They have hue of 7.5YR or 10YR and value and chroma of 3 or 4. They are loamy fine

sand, loamy sand, or sandy loam. The depth to the uppermost lamella typically is 30 inches but ranges from 27 to 46 inches.

Clarence series

The Clarence series consists of deep, somewhat poorly drained, very slowly permeable soils on uplands. These soils formed in loess or silty material and in the underlying silty clay or clay glacial till. Slopes range from 0 to 6 percent.

Clarence soils are similar to Nappanee, Rowe, Rutland, and Swygert soils and commonly are adjacent to Chatsworth, Nappanee, Rowe, and Rutland soils. The moderately well drained Chatsworth soils are on side slopes below the Clarence soils. Nappanee and Rutland soils are in positions on the landscape similar to those of the Clarence soils. Nappanee soils lack a mollic epipedon. The solum of Rutland and Swygert soils contains less clay than that of the Clarence soils. The poorly drained Rowe soils are in shallow depressions and drainageways.

Typical pedon of Clarence silty clay loam, 0 to 3 percent slopes, 480 feet south and 1,590 feet east of the northwest corner of sec. 21, T. 24 N., R. 10 E.

Ap—0 to 7 inches; very dark gray (10YR 3/1) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate fine and medium granular structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

A12—7 to 11 inches; very dark grayish brown (10YR 3/2) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate fine and medium granular structure; friable; many fine roots; very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; clear smooth boundary.

B1t—11 to 16 inches; dark grayish brown (2.5Y 4/2) silty clay; few fine distinct yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; firm; common fine roots; common thin dark grayish brown (10YR 4/2) and very dark gray (10YR 3/1) clay films on faces of peds; neutral; clear smooth boundary.

B21t—16 to 24 inches; dark grayish brown (2.5Y 4/2) clay; many fine faint light olive brown (2.5Y 5/4) and common fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few fine roots; many dark grayish brown (10YR 4/2) and few very dark gray (10YR 3/1) clay films on faces of peds; neutral; clear smooth boundary.

B22t—24 to 29 inches; grayish brown (2.5Y 5/2) silty clay; common fine distinct yellowish brown (10YR 5/6) and gray (10YR 5/1) and common fine faint light olive brown (2.5Y 5/4) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; many dark gray (10YR 4/1) clay films on faces of peds; few very dark gray (5Y 3/1) organic coatings along root channels; few pebbles; few fine dark accumulations (iron and manganese oxide); very dark gray (10YR 3/1) krotovinas; mildly alkaline; clear smooth boundary.

B3t—29 to 39 inches; dark grayish brown (2.5Y 4/2) silty clay; common fine distinct yellowish brown (10YR 5/6) and few fine distinct gray (10YR 6/1) mottles; moderate medium prismatic structure; very firm; few fine roots; few dark gray (10YR 4/1) clay films on faces of peds; few very dark gray (10YR 3/1) organic coatings along root channels; slight effervescence; common soft white accumulations of calcium carbonate; moderately alkaline; gradual wavy boundary.

C—39 to 60 inches; mottled dark grayish brown (2.5Y 4/2), light olive brown (2.5Y 5/4), and gray (5Y 5/1) silty clay; massive; very firm; few pebbles; strong effervescence (18 percent calcium carbonate equivalent); common soft white accumulations of calcium carbonate and some cleavage planes coated with lime; moderately alkaline.

The thickness of the solum ranges from 20 to 50 inches. The depth to glacial till and free carbonates ranges from 20 to 30 inches. The thickness of the mollic epipedon ranges from 10 to 20 inches.

The A horizon has value of 2 or 3 and chroma of 2 or less. It is dominantly silty clay loam, but the range includes silt loam and silty clay. The B2 horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 through 5. It ranges from neutral to moderately alkaline. It is silty clay or clay. The content of clay in the control section ranges from 50 to 60 percent. The C horizon is silty clay or clay.

In the map unit Clarence silty clay loam, 2 to 6 percent slopes, eroded, the mollic epipedon is thinner than is defined as the range for the series. This difference, however, does not significantly affect the use or behavior of the soil.

Comfrey series

The Comfrey series consists of deep, poorly drained, moderately permeable soils on bottom land. These soils formed in loamy alluvial sediments. Slopes range from 0 to 2 percent.

Comfrey soils are similar to Sawmill soils and commonly are adjacent to Sawmill and Zook soils. Their positions on the landscape are similar to those of the

adjacent soils. The subsoil of Sawmill soils contains less sand than that of the Comfrey soils. The solum of Zook soils contains more clay than that of the Comfrey soils.

Typical pedon of Comfrey loam, 2,060 feet south and 1,480 feet east of the northwest corner of sec. 16, T. 25 N., R. 11 W.

A11—0 to 11 inches; black (10YR 2/1) loam, very dark gray (10YR 3/1) dry; moderate fine granular structure; friable; many fine roots; neutral; gradual smooth boundary.

A12—11 to 18 inches; black (10YR 2/1) loam, very dark gray (10YR 3/1) dry; moderate medium granular structure; friable; many fine roots; neutral; gradual smooth boundary.

A13—18 to 25 inches; very dark gray (10YR 3/1) loam, gray (10YR 5/1) dry; weak fine subangular blocky structure parting to weak fine granular; friable; common fine roots; many thin black (10YR 2/1) organic coatings on faces of peds; neutral; gradual smooth boundary.

B2g—25 to 34 inches; very dark gray (5Y 3/1) clay loam, dark olive gray (5Y 3/2) and dark gray (5Y 4/1) dry; many fine distinct olive brown (2.5Y 4/4) mottles; weak fine subangular blocky structure; firm; common fine roots; mildly alkaline; gradual smooth boundary.

B3g—34 to 41 inches; mottled dark gray (5Y 4/1) and yellowish brown (10YR 5/6) clay loam; weak fine and medium subangular blocky structure; firm; few fine roots; discontinuous thin very dark gray (10YR 3/1) organic coatings on faces of peds and in channel fillings; mildly alkaline; gradual smooth boundary.

Cg—41 to 60 inches; mottled gray (5Y 5/1) and yellowish brown (10YR 5/6 and 5/8) loam; dark gray (5Y 4/1) and very dark gray (5Y 3/1) krotovinas; massive; friable; slight effervescence; mildly alkaline.

The thickness of the solum ranges from 24 to 50 inches. The depth to free carbonates ranges from 30 to 60 inches. The thickness of the mollic epipedon ranges from 24 to 36 inches.

The A horizon has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 or less. It is dominantly loam, but the range includes clay loam and silt loam. The Bg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 2 or 3 in the upper part and 3 through 6 in the lower part and has chroma of 2 or less. It is dominantly clay loam, but the range includes loam, silt loam, and silty clay loam. The C horizon is dominantly loam but in some pedons is clay loam. Also, it has thin layers of sandy loam and sandy clay loam in some pedons.

Corwin series

The Corwin series consists of deep, moderately well drained, moderately slowly permeable soils on uplands. These soils formed dominantly in loam glacial till but in some areas also formed in a thin overlying layer of loess or silty material. Slopes range from 1 to 12 percent.

Corwin soils are similar to Odell and Saybrook soils and commonly are adjacent to those soils and to Selma soils. The somewhat poorly drained Odell soils are less sloping than the Corwin soils. The subsoil of Saybrook soils contains less sand than that of the Corwin soils. The poorly drained Selma soils are in shallow depressions and drainageways.

Typical pedon of Corwin loam, 1 to 5 percent slopes, 2,559 feet north and 391 feet west of the center of sec. 25, T. 27 N., R. 12 W.

Ap—0 to 7 inches; very dark gray (10YR 3/1) loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; many fine roots; few pebbles; neutral; abrupt smooth boundary.

A12—7 to 11 inches; very dark grayish brown (10YR 3/2) loam, brown (10YR 5/3) dry; moderate fine and medium granular structure; friable; many fine roots; many thin very dark gray (10YR 3/1) organic coatings on faces of peds; few pebbles; neutral; clear smooth boundary.

B21t—11 to 21 inches; yellowish brown (10YR 5/4) clay loam; weak medium prismatic structure parting to moderate very fine subangular blocky; firm; many fine roots; many thin very dark grayish brown (10YR 3/2) clay films on faces of peds; few pebbles; mildly alkaline; clear smooth boundary.

B22t—21 to 30 inches; yellowish brown (10YR 5/4) clay loam; few fine faint grayish brown (10YR 5/2) mottles; weak medium prismatic structure parting to weak fine subangular blocky; firm; common fine roots; many thin very dark grayish brown (10YR 3/2) clay films on faces of peds; few pebbles; mildly alkaline; clear smooth boundary.

C1—30 to 43 inches; yellowish brown (10YR 5/4) loam; weak medium prismatic structure parting to weak fine subangular blocky; firm; common fine roots; few pebbles; strong effervescence; moderately alkaline; gradual smooth boundary.

C2—43 to 60 inches; mottled yellowish brown (10YR 5/4) and grayish brown (2.5Y 5/2) loam; massive; firm; few fine roots along cleavage planes; many thin very dark grayish brown (10YR 3/2) organic coatings on vertical faces of peds; few pebbles; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 20 to 40 inches. It commonly is the same as the depth to free carbonates. The mollic epipedon is 10 to 13 inches thick.

The A horizon has value of 2 or 3 and chroma of 1 through 3. It is loam, silt loam, or clay loam. The B2 horizon has hue of 10YR or 2.5Y, value of 3 through 5, and chroma of 2 through 6. In the lower part it commonly has mottles with hue of 10YR, value of 4 through 6, and chroma of 1 through 6. It is slightly acid

to mildly alkaline. It is clay loam or loam. The content of clay in the control section ranges from 24 to 35 percent.

In the map unit Corwin clay loam, 5 to 12 percent slopes, severely eroded, the mollic epipedon is thinner than is defined as the range for the series. This difference, however, does not significantly affect the use or behavior of the soil.

Del Rey series

The Del Rey series consists of deep, somewhat poorly drained, slowly permeable soils on uplands. These soils formed in silty or clayey lacustrine sediments. Slopes range from 0 to 7 percent.

Del Rey soils are similar to Martinton soils and commonly are adjacent to Martinton and Milford soils. Both of the adjacent soils have a mollic epipedon. Martinton soils are in positions on the landscape similar to those of the Del Rey soils. The poorly drained Milford soils are in shallow depressions and drainageways.

Typical pedon of Del Rey silt loam, 0 to 2 percent slopes, 155 feet south and 1,200 feet west of the northeast corner of sec. 1, T. 25 N., R. 11 E.

A1—0 to 4 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate fine and medium granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

A2—4 to 9 inches; light brownish gray (10YR 6/2) silt loam, light gray (10YR 7/2) dry; moderate fine and medium platy structure; friable; many fine roots; medium acid; abrupt smooth boundary.

B21t—9 to 12 inches; brown (10YR 5/3) silty clay loam; strong fine subangular blocky structure; firm; common fine roots; continuous thin pale brown (10YR 6/3) silt coatings and grayish brown (10YR 5/2) clay films on faces of peds; strongly acid; clear smooth boundary.

B22tg—12 to 25 inches; light brownish gray (2.5Y 6/2) silty clay; few fine prominent yellowish brown (10YR 5/8) mottles; strong fine and medium subangular blocky structure; firm; common fine roots; continuous thin grayish brown (10YR 5/2) clay films on faces of peds; strongly acid; clear smooth boundary.

B23t—25 to 33 inches; mottled light olive brown (2.5Y 5/4), light brownish gray (2.5Y 6/2), and light gray (10YR 6/1) silty clay; moderate fine and medium angular and subangular blocky structure; firm; common fine roots; continuous thin grayish brown (2.5Y 5/2) clay films on faces of peds; strongly acid; gradual smooth boundary.

B3t—33 to 41 inches; mottled light olive brown (2.5Y 5/4), light brownish gray (2.5Y 6/2), and light gray (10YR 6/1) silty clay loam; weak coarse angular and subangular blocky structure; firm; few fine roots; continuous thin grayish brown (2.5Y 5/2) clay films on faces of peds; mildly alkaline; gradual smooth boundary.

C—41 to 60 inches; mottled grayish brown (10YR 5/2) and yellowish brown (10YR 5/6 and 5/8) silty clay loam; massive; friable; patchy light gray (10YR 7/1) silt coatings on bedding planes; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 24 to 48 inches. The A1 or Ap horizon has value of 3 or 4 and chroma of 1 or 2. The A2 horizon has hue of 10YR, value of 4 through 6, and chroma of 2 or less. Some pedons do not have an A2 horizon. The A horizon is silt loam, loam, or silty clay loam. The B2 horizon has hue of 10YR, 2.5Y, or 5Y, value of 3 through 6, and chroma of 2 through 6. It ranges from slightly acid to strongly acid. It is dominantly silty clay loam or silty clay but in some pedons has thin strata of silt loam. The content of clay in the control section ranges from 35 to 45 percent. The C horizon typically is stratified silt loam, silty clay loam, or silty clay. It ranges from slightly acid to moderately alkaline and commonly has free carbonates.

In the map unit Del Rey silty clay loam, 2 to 7 percent slopes, eroded, the solum is thinner than is defined as the range for the series. This difference, however, does not significantly affect the use or behavior of the soil.

Elliott series

The Elliott series consists of deep, somewhat poorly drained soils on uplands. These soils formed in loess or silty material and in the underlying silty clay loam glacial till. They are moderately slowly permeable in the subsoil and slowly permeable in the substratum. Slopes range from 0 to 5 percent.

Elliott soils are similar to Andres and Varna soils and commonly are adjacent to those soils and to Ashkum and Reddick soils. The upper part of the B horizon in Andres soils contains more sand than that of the Elliott soils. The poorly drained Ashkum and Reddick soils are in shallow depressions and drainageways. Also, the solum of Reddick soils contains less clay than that of the Elliott soils. Varna soils are moderately well drained.

Typical pedon of Elliott loam, 0 to 2 percent slopes, 2,175 feet south and 87 feet west of the northeast corner of sec. 19, T. 29 N., R. 14 W.

Ap—0 to 9 inches; very dark gray (10YR 3/1) loam, dark grayish brown (10YR 4/2) dry; weak very fine granular structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

A3—9 to 14 inches; very dark gray (10YR 3/1) loam, dark grayish brown (10YR 4/2) dry; weak very fine and fine subangular blocky structure parting to weak very fine granular; friable; many fine roots; neutral; clear smooth boundary.

B21t—14 to 17 inches; dark brown (10YR 4/3) clay; few fine faint yellowish brown (10YR 5/6) mottles; weak very fine and fine subangular blocky structure; friable; many fine roots; common thin dark grayish brown (10YR 4/2) clay films on faces of peds; neutral; clear smooth boundary.

B22t—17 to 25 inches; brown (10YR 5/3) silty clay; many medium faint dark yellowish brown (10YR 4/4) and common fine faint gray (10YR 5/1) mottles; moderate medium prismatic structure parting to weak fine subangular blocky; firm; common fine roots; many thin very dark gray (10YR 3/1) clay films on faces of peds; slight effervescence; neutral; clear smooth boundary.

B31t—25 to 31 inches; yellowish brown (10YR 5/4) silty clay loam; common fine faint gray (10YR 5/1) and yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to weak fine subangular blocky; firm; common fine roots; common thin very dark gray (10YR 3/1) clay films on faces of peds; slight effervescence; mildly alkaline; clear smooth boundary.

B32t—31 to 38 inches; yellowish brown (10YR 5/4) silty clay loam; many medium faint gray (10YR 5/1) and common fine faint yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to weak fine and medium subangular blocky; firm; few fine roots; many thin dark grayish brown (10YR 4/2) clay films on faces of peds; strong effervescence; mildly alkaline; clear smooth boundary.

C—38 to 60 inches; yellowish brown (10YR 5/4) silty clay loam; many medium faint gray (10YR 5/1) and few medium distinct strong brown (7.5YR 5/6) mottles; massive; firm; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 20 to 45 inches. It commonly is more than the depth to free carbonates. The thickness of the mollic epipedon ranges from 10 to 20 inches.

The A horizon has value of 2 or 3 and chroma of 1 or 2. It is loam, silt loam, or silty clay loam. The B2 horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 2 through 4. It is dominantly silty clay or silty clay loam but in many pedons has thin layers of clay. It is medium acid to neutral in the upper part and neutral or mildly alkaline in the lower part. The C horizon is dominantly silty clay loam, but the range includes clay loam.

In the map unit Elliott silty clay loam, 2 to 5 percent slopes, eroded, the dark surface layer is thinner than is defined as the range for the series. This difference, however, does not significantly affect the use or behavior of the soil.

Gilford series

The Gilford series consists of deep, very poorly drained soils on outwash plains. These soils formed in wind- or water-deposited loamy and sandy glacial outwash. They are moderately rapidly permeable in the subsoil and rapidly permeable in the substratum. Slopes range from 0 to 2 percent.

Gilford soils are similar to Granby soils and commonly are adjacent to Aurelius, Granby, Houghton, and Selma soils. Aurelius and Houghton soils are in depressions. They formed in organic material. Granby soils are in positions on the landscape similar to those of the Gilford soils. They are sandy. The poorly drained Selma soils are higher on the landscape than the Gilford soils. Also, their subsoil contains more clay.

Typical pedon of Gilford very fine sandy loam, 110 feet north and 1,650 feet east of the southwest corner of sec. 6, T. 27 N., R. 12 W.

Ap—0 to 9 inches; black (10YR 2/1) very fine sandy loam, very dark gray (10YR 3/1) dry; weak medium and fine granular structure; very friable; neutral; abrupt smooth boundary.

A12—9 to 15 inches; black (10YR 2/1) very fine sandy loam, dark gray (10YR 4/1) dry; weak medium and fine subangular blocky structure parting to weak medium granular; very friable; neutral; clear smooth boundary.

B1—15 to 21 inches; very dark gray (10YR 3/1) very fine sandy loam, gray (10YR 5/1) dry; weak medium and fine subangular blocky structure parting to weak medium granular; friable; neutral; clear smooth boundary.

B21g—21 to 32 inches; dark grayish brown (2.5Y 4/2) very fine sandy loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; common fine roots; neutral; clear smooth boundary.

B22g—32 to 37 inches; grayish brown (2.5Y 5/2) very fine sandy loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; very friable; few fine roots; neutral; clear smooth boundary.

C1—37 to 48 inches; grayish brown (2.5Y 5/2) loamy fine sand; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; loose; few fine roots; mildly alkaline; clear smooth boundary.

C2g—48 to 60 inches; mottled grayish brown (2.5Y 5/2) and dark gray (10YR 4/1) fine sand; single grained; loose; few fine roots; mildly alkaline.

The solum ranges from 30 to 40 inches in thickness. It is slightly acid to mildly alkaline. The thickness of the mollic epipedon ranges from 10 to 22 inches.

The A horizon has value of 2 or 3 and chroma of 1 or 2. It is dominantly very fine sandy loam, but the range includes fine sandy loam, loam, and loamy sand. The B2g horizon has hue of 10YR or 2.5Y, value of 3 through 6, and chroma of 1 or 2. It is dominantly very fine sandy loam, but in some pedons it is fine sandy loam or has thin layers of loam, sandy clay loam, or loamy sand. The C horizon is dominantly loamy fine sand and fine sand but in some pedons has thin strata of silt or sandy loam. It is neutral to moderately alkaline and in some pedons has free carbonates.

Granby series

The Granby series consists of deep, very poorly drained, rapidly permeable soils on outwash plains. These soils formed in wind- or water-deposited sandy and loamy material. Slopes range from 0 to 2 percent.

Granby soils are similar to Gilford soils and commonly are adjacent to Aurelius, Gilford, Houghton, Morocco, and Watseka soils. Aurelius and Houghton soils are in depressions. They formed in organic material. Gilford soils are in positions on the landscape similar to those of the Granby soils. They contain more clay in the subsoil and substratum than the Granby soils. The somewhat poorly drained Morocco and Watseka soils are higher on the landscape than the Granby soils. Also, Morocco soils lack a mollic epipedon.

Typical pedon of Granby fine sandy loam, 1,360 feet north and 100 feet west of the southeast corner of sec. 21, T. 29 N., R. 11 W.

Ap—0 to 8 inches; black (10YR 2/1) fine sandy loam, dark gray (10YR 4/1) dry; weak fine granular structure; very friable; neutral; abrupt smooth boundary.

A12—8 to 17 inches; very dark grayish brown (10YR 3/2) loamy sand, dark grayish brown (10YR 4/2) dry; few fine faint yellowish brown (10YR 5/6) and common fine distinct dark grayish brown (2.5Y 4/2) mottles; weak fine subangular blocky structure parting to weak medium granular; very friable; many thin very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

C1g—17 to 23 inches; dark grayish brown (2.5Y 4/2) loamy fine sand; many coarse distinct yellowish brown (10YR 5/6) and dark gray (10YR 4/1) mottles; weak fine subangular blocky structure; loose; very dark grayish brown (2.5Y 3/2) krotovinas at 25 to 30 inches; neutral; clear smooth boundary.

C2g—23 to 30 inches; dark grayish brown (2.5Y 4/2) loamy fine sand; many medium distinct olive brown (2.5Y 4/4) mottles; weak medium subangular blocky structure; loose; neutral; clear smooth boundary.

C3g—30 to 40 inches; mottled grayish brown (10YR 5/2) and brown (10YR 5/3) fine sand; single grained; loose; mildly alkaline; gradual smooth boundary.

C4g—40 to 60 inches; olive gray (5Y 5/2) fine sand; single grained; loose; many thin dark yellowish brown stains (iron and manganese oxide); mildly alkaline.

The thickness of the solum and of the mollic epipedon ranges from 14 to 24 inches. Reaction is slightly acid to mildly alkaline in the upper 40 inches and neutral to moderately alkaline below that depth.

The A horizon has value of 2 or 3 and chroma of 1 or 2. It is dominantly fine sandy loam, but the range includes fine sand and loamy fine sand. The C horizon has hue of 10YR, 2.5Y, or 5Y, value of 3 through 6, and chroma of 2 or less. It is dominantly loamy fine sand and fine sand, but the range includes fine sandy loam and sand.

Harco series

The Harco series consists of deep, somewhat poorly drained, moderately permeable soils on upland stream terraces. These soils formed in loess or silty material. Slopes range from 0 to 2 percent.

Harco soils are similar to Barrington, La Hogue, and Pella soils and commonly are adjacent to those soils and to Jasper and Selma soils. The moderately well drained Barrington and well drained Jasper soils are in the more sloping areas. La Hogue soils are on outwash plains. Their solum contains more sand than that of the Harco soils. The poorly drained Pella and Selma soils are in shallow depressions and drainageways. Their solum contains more sand than that of the Harco soils.

Typical pedon of Harco silt loam, 495 feet south and 121 feet west of the northeast corner of sec. 36, T. 27 N., R. 14 W.

Ap—0 to 9 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate very fine granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

A12—9 to 13 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak very fine granular structure; friable; many fine roots; neutral; clear smooth boundary.

B1—13 to 17 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; weak very fine subangular blocky structure parting to weak very fine granular; friable; common fine roots; many thin black (10YR 2/1) organic coatings on faces of peds; neutral; clear smooth boundary.

B21t—17 to 22 inches; dark brown (10YR 4/3) silty clay loam; weak fine subangular blocky structure; firm; common fine roots; many thin very dark gray (10YR 3/1) organic coatings on faces of peds; many thin dark grayish brown (10YR 4/2) and dark brown (10YR 4/3) clay films on faces of peds; neutral; clear smooth boundary.

B22t—22 to 29 inches; dark brown (10YR 4/3) silty clay loam; many fine distinct grayish brown (2.5Y 5/2) and common fine faint yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate medium and fine subangular blocky; firm; few fine roots; many thin dark grayish brown (10YR 4/2) clay films on faces of peds; neutral; clear smooth boundary.

B31tg—29 to 38 inches; grayish brown (2.5Y 5/2) silty clay loam; many fine faint light brownish gray (2.5Y 6/2), common fine distinct yellowish brown (10YR 5/6), and few fine distinct strong brown (7.5YR 5/6) mottles; weak medium prismatic structure parting to moderate medium and fine subangular blocky; firm; few fine roots; many thin grayish brown (10YR 5/2) clay films on faces of peds; neutral; clear smooth boundary.

B32tg—38 to 40 inches; grayish brown (2.5Y 5/2) silty clay loam; many fine faint light brownish gray (2.5Y 6/2) and common fine distinct yellowish brown (10YR 5/6) mottles; weak fine and medium subangular blocky structure; firm; few fine roots; common thin grayish brown (10YR 5/2) clay films on faces of peds; slight effervescence; neutral; clear smooth boundary.

IICg—40 to 60 inches; mottled light gray (10YR 7/1) and brown (10YR 5/3) stratified silt loam and silty clay loam; massive; friable; few fine strong brown (7.5YR 5/6) accumulations (iron and manganese oxide); strong effervescence; mildly alkaline.

The thickness of the solum ranges from 25 to 45 inches. The depth to free carbonates ranges from 30 to 40 inches. The thickness of the mollic epipedon ranges from 10 to 18 inches.

The A horizon has value of 2 or 3 and chroma of 1 or 2. The B2 horizon has hue of 10YR or 2.5Y, value of 4 or more, and chroma of 2 through 4. It is silty clay loam or silt loam. It is slightly acid or neutral. Some pedons do not have a IIC horizon.

Houghton series

The Houghton series consists of deep, very poorly drained, moderately permeable soils in upland depressions. These soils formed in highly decomposed herbaceous organic material. Slopes are less than 2 percent.

Houghton soils commonly are adjacent to Aurelius, Gilford, Granby, and Selma soils. They are lower on the landscape than those soils. Aurelius soils have mineral material within a depth of 51 inches. Gilford, Granby, and Selma soils are mineral soils. Also, Selma soils are poorly drained.

Typical pedon of Houghton muck, 1,220 feet south and 100 feet west of the northeast corner of sec. 20, T. 28 N., R. 11 W.

Oap—0 to 9 inches; black (N 2/0), broken face and rubbed, sapric material; less than 5 percent fiber, a trace rubbed; weak fine and very fine granular structure; nonsticky; many fine roots; medium acid; abrupt smooth boundary.

Oa2—9 to 19 inches; black (N 2/0), broken face, and dark brown (7.5YR 3/2), rubbed, sapric material; about 5 to 10 percent fiber, a trace rubbed; weak fine subangular blocky structure; nonsticky; many fine roots; strongly acid; clear smooth boundary.

Oa3—19 to 28 inches; very dark gray (10YR 3/1), broken face, and dark brown (7.5YR 4/4), rubbed, sapric material; about 5 to 10 percent fiber; a trace rubbed; moderate medium platy structure; nonsticky; common fine roots; slightly acid; clear smooth boundary.

Oa4—28 to 34 inches; very dark gray (10YR 3/1), broken face, and very dark grayish brown (10YR 3/2), rubbed, sapric material; less than 5 percent fiber, a trace rubbed; moderate thick platy structure; nonsticky; few fine roots; slightly acid; clear smooth boundary.

Oa5—34 to 60 inches; black (N 2/0), broken face, and black (5Y 2/1), rubbed, sapric material; less than 5 percent fiber, a trace rubbed; massive; nonsticky; common fine white accumulations of calcium carbonate; broken snail shells; mildly alkaline.

The thickness of the organic layer is more than 51 inches. The organic fibers are derived primarily from herbaceous plants, but in some layers the content of woody material is as much as 30 percent.

The organic material has hue of 10YR or 7.5YR or is neutral in hue. It has value of 2 or 3 and chroma of 0 through 3. It is dominantly sapric material, but some pedons have a total of less than 10 inches of hemic material and less than 5 inches of fibric material. Reaction ranges from strongly acid to neutral in the upper part of the profile and from slightly acid to mildly alkaline in the lower part.

Jasper series

The Jasper series consists of deep, well drained, moderately permeable soils on outwash plains. These soils formed in glacial outwash. Slopes range from 1 to 5 percent.

These soils contain less sand than is definitive for the Jasper series. This difference, however, does not significantly affect the use or behavior of the soils.

Jasper soils are similar to Martinsville soils and commonly are adjacent to Harco, La Hogue, Pella, and Selma soils. The somewhat poorly drained Harco and La Hogue soils are lower on the landscape than the Jasper soils. Martinsville soils are in positions on the landscape similar to those of the Jasper soils. They lack a mollic epipedon. The poorly drained Pella and Selma soils are in shallow depressions and drainageways. The solum of Harco and Pella soils contains less sand than that of the Jasper soils.

Typical pedon of Jasper silt loam, 1 to 5 percent slopes, 915 feet north and 140 feet west of the southeast corner of sec. 1, T. 26 N., R. 11 W.

Ap—0 to 7 inches; very dark gray (10YR 3/1) silt loam, dark grayish brown (10YR 4/2) dry; moderate very fine granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

A12—7 to 11 inches; very dark grayish brown (10YR 3/2) silt loam, dark brown (10YR 4/3) dry; moderate very fine granular structure; friable; many fine roots; neutral; clear smooth boundary.

B1t—11 to 14 inches; dark brown (10YR 4/3) loam; weak medium prismatic structure parting to weak very fine subangular blocky; friable; common fine roots; many thin very dark grayish brown (10YR 3/2) clay films on faces of peds; neutral; clear smooth boundary.

B21t—14 to 20 inches; dark yellowish brown (10YR 4/4) loam; weak medium prismatic structure parting to fine and medium subangular blocky; friable; common fine roots; many thin dark brown (10YR 3/3) clay films on faces of peds; medium acid; clear smooth boundary.

B22t—20 to 27 inches; yellowish brown (10YR 5/6) loam; weak medium prismatic structure parting to weak medium subangular blocky; friable; common fine roots; many thin dark brown (10YR 4/3) clay films on faces of peds; medium acid; clear smooth boundary.

B23t—27 to 35 inches; dark yellowish brown (10YR 4/6) loam; weak medium prismatic structure; firm; few fine roots; many thin dark yellowish brown (10YR 4/4) clay films on faces of peds; medium acid; clear smooth boundary.

B3t—35 to 41 inches; yellowish brown (10YR 5/6) loam; weak medium prismatic structure; firm; few fine roots; common thin dark yellowish brown (10YR 4/4) clay films on faces of peds; neutral; clear smooth boundary.

C—41 to 60 inches; mottled light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6) stratified silt loam, loamy sand, and sandy loam; massive; friable; mildly alkaline.

The thickness of the solum ranges from 30 to 48 inches. The thickness of the mollic epipedon ranges from 10 to 18 inches.

The A horizon has value of 2 or 3 and chroma of 1 through 3. It is dominantly silt loam, but the range includes loam and fine sandy loam. The B2 horizon has hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 3 through 8. It is dominantly loam but in some pedons is clay loam or sandy clay loam or has subhorizons of silty clay loam or fine sandy loam. It is strongly acid or medium acid. The C horizon commonly is stratified. It is dominantly silt loam, loamy sand, and sandy loam but in some pedons has thin layers of silty clay loam, clay, or gravelly coarse sand. It ranges from slightly acid to moderately alkaline and in some pedons has free carbonates.

La Hogue series

The La Hogue series consists of deep, somewhat poorly drained soils on outwash plains. These soils formed in glacial outwash. They are moderately permeable in the subsoil and moderately rapidly permeable in the substratum. Slopes range from 0 to 2 percent.

La Hogue soils are similar to Harco and Selma soils and commonly are adjacent to those soils and to Jasper and Pella soils. Harco soils are in positions on the landscape similar to those of the La Hogue soils. Their subsoil contains less sand than that of the La Hogue soils. The well drained Jasper soils are higher on the landscape than the La Hogue soils. The poorly drained Pella and Selma soils are in shallow depressions and drainageways. Also, the subsoil of Pella soils contains less sand than that of the La Hogue soils.

Typical pedon of La Hogue loam, 834 feet south and 126 feet east of the northwest corner of sec. 7, T. 26 N., R. 10 W.

Ap—0 to 9 inches; black (10YR 2/1) loam, dark grayish brown (10YR 4/2) dry; moderate very fine granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

A12—9 to 12 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; weak very fine subangular blocky structure parting to moderate very fine granular; friable; many fine roots; slightly acid; clear smooth boundary.

B1t—12 to 15 inches; dark brown (10YR 4/3) silty clay loam; moderate very fine and fine subangular blocky structure; friable; common fine roots; many thin very dark grayish brown (10YR 3/2) organic coatings on faces of peds; strongly acid; clear smooth boundary.

B21t—15 to 20 inches; dark brown (10YR 4/3) silty clay loam; common fine faint dark grayish brown (10YR 4/2) mottles; weak medium prismatic structure parting to moderate very fine and fine subangular blocky; friable; common fine roots; many thin very dark grayish brown (10YR 3/2) clay films on faces of peds; medium acid; clear smooth boundary.

B22t—20 to 26 inches; yellowish brown (10YR 5/4) clay loam; common fine faint dark grayish brown (10YR 4/2) mottles; moderate medium prismatic structure parting to moderate fine subangular blocky; friable; common fine roots; many thin dark grayish brown (10YR 4/2) clay films on faces of peds; medium acid; clear smooth boundary.

B23t—26 to 30 inches; dark yellowish brown (10YR 4/4) loam; many medium faint brown (10YR 5/3) mottles; moderate medium prismatic structure parting to weak fine subangular blocky; friable; few fine roots; many thin dark grayish brown (10YR 4/2) clay films on faces of peds; medium acid; clear smooth boundary.

B24t—30 to 39 inches; strong brown (7.5YR 5/6) loam; moderate medium prismatic structure; friable; few fine roots; many thin gray (10YR 5/1) clay films on faces of peds; slightly acid; clear smooth boundary.

B3—39 to 46 inches; mottled dark yellowish brown (10YR 4/4), dark grayish brown (10YR 4/2), and yellowish red (5YR 5/6) sandy loam; weak medium prismatic structure; friable; few fine roots; neutral; gradual wavy boundary.

C—46 to 60 inches; mottled brownish yellow (10YR 6/8), dark yellowish brown (10YR 4/4), and dark grayish brown (10YR 4/2) loamy fine sand; massive; friable; neutral.

The thickness of the solum ranges from 40 to 60 inches. The thickness of the mollic epipedon ranges from 10 to 24 inches.

The A horizon has value of 2 or 3 and chroma of 1 or 2. It is typically loam or silt loam, but the range includes sandy loam. The B2 horizon generally has hue of 10YR or 7.5YR but in some pedons has hue of 2.5Y and in others has hue of 5Y in the lower part. It has value of 4 through 6 and chroma of 2 through 6. It typically is clay loam, loam, or silty clay loam but in some pedons is sandy clay loam or silt loam that has a high content of sand. It ranges from strongly acid to neutral. The C horizon is dominantly loamy fine sand but in some pedons has strata of sand to silt loam. It is neutral or slightly acid and generally has no free carbonates within a depth of 60 inches.

Lisbon series

The Lisbon series consists of deep, somewhat poorly drained soils on uplands. These soils formed in loess or silty material and in the underlying silty glacial till. They are moderately permeable in the subsoil and moderately slowly permeable in the substratum. Slopes range from 0 to 2 percent.

Lisbon soils are similar to Odell and Saybrook soils and commonly are adjacent to Milford and Saybrook soils. The poorly drained Milford soils are in shallow depressions and drainageways. Their solum contains more clay than that of the Lisbon soils. Odell soils are in positions on the landscape similar to those of the Lisbon soils. Their subsoil contains more sand than that of the Lisbon soils. The moderately well drained Saybrook soils are more sloping than the Lisbon soils.

Typical pedon of Lisbon silt loam, 318 feet north and 147 feet east of the southwest corner of sec. 1, T. 24 N., R. 11 W.

Ap—0 to 11 inches; very dark gray (10YR 3/1) silt loam, dark grayish brown (10YR 4/2) dry; moderate fine granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

B1t—11 to 14 inches; dark grayish brown (10YR 4/2) silt loam; common fine faint yellowish brown (10YR 5/4) mottles; weak fine subangular blocky structure parting to moderate very fine granular; friable; many fine roots; many thin very dark gray (10YR 3/1) clay films on faces of peds; neutral; clear smooth boundary.

B21t—14 to 19 inches; grayish brown (10YR 5/2) silty clay loam; common fine faint brown (10YR 5/3) mottles; moderate fine subangular blocky structure; friable; common fine roots; many thin dark grayish brown (10YR 4/2) clay films on faces of peds; friable; neutral; clear smooth boundary.

B22t—19 to 31 inches; dark grayish brown (10YR 4/2) silty clay loam; common medium faint yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate fine and medium subangular blocky; firm; common fine roots; many thin very dark gray (10YR 3/1) and grayish brown (2.5Y 5/2) clay films on faces of peds; neutral; clear smooth boundary.

IIB23t—31 to 39 inches; grayish brown (2.5Y 5/2) silty clay loam; many fine distinct yellowish brown (10YR 5/4) and common fine distinct dark gray (10YR 4/1) mottles; moderate medium prismatic structure parting to weak medium subangular blocky; firm; few fine roots; many thin dark gray (10YR 4/1) clay films on faces of peds; neutral; clear wavy boundary.

IIC1—39 to 46 inches; grayish brown (2.5Y 5/2) silt loam; many medium distinct yellowish brown (10YR 5/6) and common fine distinct gray (10YR 5/1) mottles; weak medium prismatic structure; firm; few fine roots; slight effervescence; few fine white accumulations of calcium carbonate; mildly alkaline; gradual wavy boundary.

IIC2—46 to 60 inches; mottled gray (10YR 6/1), yellowish brown (10YR 5/8), and light olive brown (2.5Y 5/4) silt loam; massive; firm; strong effervescence; mildly alkaline.

The thickness of the solum ranges from 24 to 42 inches. It commonly is more than the depth to free carbonates. The thickness of the mollic epipedon ranges from 10 to 15 inches.

The A horizon has value of 2 or 3 and chroma of 1 through 3. It is dominantly silt loam, but the range includes loam. The B2 horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 2 through 6. It ranges from medium acid to neutral in the upper part and from slightly acid to moderately alkaline in the lower part. It is silty clay loam in the part formed in loess and silt loam or silty clay loam high in content of sand in the part formed in glacial till. The content of clay in the control section ranges from 27 to 35 percent. The C horizon is dominantly silt loam, but the range includes loam.

Martinsville series

The Martinsville series consists of deep, well drained, moderately permeable soils on outwash plains. These soils formed in loamy and sandy glacial outwash. Slopes range from 1 to 18 percent.

Martinsville soils are similar to Jasper soils and commonly are adjacent to Selma and Roby soils. Jasper and Selma soils have a mollic epipedon. Selma soils are poorly drained and are in shallow depressions and drainageways. Roby soils are somewhat poorly drained and are less sloping than the Martinsville soils.

Typical pedon of Martinsville loam, 1 to 5 percent slopes, 1,829 feet west and 75 feet north of the center of sec. 29, T. 27 N., R. 12 W.

Ap—0 to 10 inches; dark brown (10YR 4/3) loam, pale brown (10YR 6/3) dry; weak very fine granular structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

A2—10 to 13 inches; dark yellowish brown (10YR 4/4) loam, pale brown (10YR 6/3) dry; weak medium platy structure; friable; common fine roots; few thin dark brown (10YR 4/3) organic coatings on faces of peds; slightly acid; clear smooth boundary.

B1t—13 to 16 inches; dark yellowish brown (10YR 4/4) loam; moderate fine and medium subangular blocky structure; friable; common fine roots; common thin faint dark yellowish brown (10YR 4/4) clay films on faces of peds; slightly acid; clear smooth boundary.

B21t—16 to 24 inches; dark yellowish brown (10YR 4/4) loam; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; friable; common fine roots; many thin faint dark brown (10YR 4/3) clay films on faces of peds; few thin dark brown accumulations (iron and manganese oxide) on faces of peds; medium acid; clear smooth boundary.

B22t—24 to 29 inches; dark yellowish brown (10YR 4/4) loam; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; common fine roots; common thin faint dark brown (10YR 4/3) clay films on faces of peds; common thin dark brown accumulations (iron and manganese oxide) on faces of peds; medium acid; clear smooth boundary.

B23t—29 to 38 inches; dark yellowish brown (10YR 4/4) fine sandy loam; moderate medium prismatic structure parting to weak medium subangular blocky; friable; common thin dark brown (7.5YR 4/4) clay films on faces of peds; few thin dark brown accumulations (iron and manganese oxide) on faces of peds; medium acid; clear smooth boundary.

B24t—38 to 45 inches; dark brown (10YR 4/3) fine sandy loam; weak coarse prismatic structure parting to weak medium subangular blocky; friable; few fine roots; many thin dark brown (10YR 4/3) clay films on faces of peds; medium acid; gradual wavy boundary.

B3—45 to 56 inches; dark brown (10YR 4/3) fine sandy loam; weak coarse prismatic structure; friable; few fine roots; slightly acid; gradual wavy boundary.

C—56 to 60 inches; dark brown (10YR 4/3) loamy fine sand; massive; friable; medium acid.

The thickness of the solum ranges from 40 to 60 inches. The A1 or Ap horizon has value of 4 or 5 and chroma of 2 through 4. The A2 horizon has hue of 10YR, value of 4 through 6, and chroma of 3 through 6. The A horizon dominantly is loam, but the range includes silt loam, fine sandy loam, and sandy loam. The B2 horizon generally has hue of 10YR or 7.5YR but in some pedons has hue of 5YR. It has value of 4 through 6 and chroma of 3 through 6. It ranges from strongly acid to neutral. It is dominantly loam or fine sandy loam, but the range includes sandy clay loam, silty clay loam, sandy loam, and clay loam. The content of clay in the control section ranges from 20 to 35 percent.

The C horizon is stratified loamy fine sand, sand, silt loam, sandy clay loam, or loam. It ranges from medium acid to moderately alkaline and in some pedons has free carbonates.

Martinton series

The Martinton series consists of deep, somewhat poorly drained, moderately slowly permeable soils on

uplands. These soils formed in silty or clayey lacustrine sediments. Slopes range from 0 to 5 percent.

Martinton soils are similar to Del Rey and Milford soils and commonly are adjacent to those soils. Del Rey soils are in positions on the landscape similar to those of the Martinton soils. They lack a mollic epipedon. The poorly drained Milford soils are in shallow depressions and drainageways. They do not have an argillic horizon.

Typical pedon of Martinton silty clay loam, 0 to 2 percent slopes, 230 feet north and 2,790 feet west of the southeast corner of sec. 8, T. 25 N., R. 14 W.

Ap—0 to 7 inches; black (10YR 2/1) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate fine granular structure; friable; medium acid; abrupt smooth boundary.

A12—7 to 13 inches; black (10YR 2/1) silty clay loam, dark grayish brown (10YR 4/2) dry; strong fine and medium granular structure; friable; medium acid; clear smooth boundary.

A3—13 to 17 inches; black (10YR 2/1) silty clay loam, dark grayish brown (10YR 4/2) dry; strong medium and coarse granular structure; friable; medium acid; clear smooth boundary.

B21t—17 to 21 inches; dark grayish brown (10YR 4/2) silty clay loam; strong fine subangular blocky structure; firm; continuous thin grayish brown (10YR 5/2) clay films on faces of peds; medium acid; clear smooth boundary.

B22t—21 to 27 inches; dark grayish brown (10YR 4/2) silty clay; few fine prominent yellowish brown (10YR 5/6 and 5/8) and light brownish gray (2.5Y 6/2) mottles; moderate fine angular and subangular blocky structure; firm; continuous thin grayish brown (2.5Y 5/2) clay films on faces of peds; slightly acid; clear smooth boundary.

B23tg—27 to 35 inches; olive gray (5Y 5/2) silty clay loam; few fine prominent yellowish brown (10YR 5/8) and common medium prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate and strong medium angular blocky; firm; continuous thin dark gray (5Y 4/1) clay films on faces of peds; slightly acid; gradual smooth boundary.

B31tg—35 to 42 inches; olive gray (5Y 5/2) silty clay loam; common fine prominent yellowish brown (10YR 5/6 and 5/8) mottles; weak coarse angular blocky structure; firm; continuous thin olive gray (5Y 5/2) clay films on faces of peds; mildly alkaline; gradual smooth boundary.

B32tg—42 to 46 inches; olive (5Y 5/3) silt loam; common fine prominent yellowish brown (10YR 5/6 and 5/8) and common fine distinct gray (5Y 5/1) mottles; weak coarse angular blocky structure; friable; common thin olive gray (5Y 5/2) and olive (5Y 5/3) clay films on faces of peds; slight effervescence; mildly alkaline; gradual smooth boundary.

Cg—46 to 60 inches; mottled gray (5Y 6/1 and 5/1) and yellowish brown (10YR 5/4, 5/6, and 5/8) stratified silt loam and fine sandy loam; massive; friable; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 30 to 52 inches. The thickness of the mollic epipedon ranges from 10 to 20 inches.

The A horizon has value of 2 or 3 and chroma of 2 or less. It is silt loam or silty clay loam. The B horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 through 6, and chroma of 1 through 6. It ranges from medium acid to mildly alkaline. The pH typically increases with increasing depth. This horizon is dominantly silty clay or silty clay loam but has thin layers of silt loam in some pedons. The content of clay in the control section ranges from 35 to 45 percent. The C horizon typically is stratified silt loam, fine sandy loam, silty clay, silty clay loam, clay loam, or gravelly clay loam. It is mildly alkaline or moderately alkaline and has free carbonates.

The dark A horizon of Martinton silty clay loam, 2 to 5 percent slopes, eroded, is thinner than is defined as the range for the series. This difference, however, does not significantly affect the use or behavior of the soil.

Miami series

The Miami series consists of deep, well drained soils on uplands. These soils formed dominantly in loamy glacial till but in some areas also formed in a thin mantle of loess or silty material. They are moderately permeable in the subsoil and moderately slowly permeable in the substratum. Slopes range from 1 to 5 percent.

Miami soils are similar to Corwin soils and commonly are adjacent to Chelsea and Roby soils. Corwin soils are in positions on the landscape similar to those of the Miami soils. They have a mollic epipedon. The excessively drained Chelsea soils are slightly higher on the landscape than the Miami soils, and the somewhat poorly drained Roby soils are lower.

Typical pedon of Miami silt loam, 1 to 5 percent slopes, 900 feet north and 660 feet east of the southwest corner of sec. 21, T. 27 N., R. 11 W.

A1—0 to 4 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; very friable; neutral; clear smooth boundary.

A2—4 to 9 inches; dark brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak medium platy structure parting to weak very fine subangular blocky; very friable; many thin very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.

B21t—9 to 11 inches; dark yellowish brown (10YR 4/4) loam; weak fine prismatic structure parting to moderate fine and medium subangular blocky; friable; common thin dark brown (10YR 3/3) clay films on faces of peds; common pebbles; slightly acid; clear smooth boundary.

B22t—11 to 15 inches; dark yellowish brown (10YR 4/4) clay loam; moderate fine prismatic structure parting to moderate very fine and fine subangular blocky; firm; continuous thick dark brown (10YR 3/3) clay films on faces of peds; common pebbles; neutral; clear smooth boundary.

B23t—15 to 20 inches; yellowish brown (10YR 5/4) clay loam; moderate medium prismatic structure parting to moderate fine subangular blocky; firm; many thin dark brown (10YR 4/3) clay films on faces of peds; common pebbles; neutral; clear smooth boundary.

B24t—20 to 28 inches; yellowish brown (10YR 5/4) clay loam; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; firm; many thin dark brown (10YR 4/3) clay films on faces of peds; common pebbles; neutral; abrupt smooth boundary.

B3t—28 to 37 inches; brown (10YR 5/3) loam; moderate medium prismatic structure parting to weak medium subangular blocky; firm; many thin dark brown (10YR 4/3) clay films on faces of peds; common pebbles; violent effervescence; mildly alkaline; clear wavy boundary.

C—37 to 60 inches; brown (10YR 5/3) loam; many fine faint yellowish brown (10YR 5/8) mottles; massive; firm; common pebbles; violent effervescence; moderately alkaline.

The thickness of the solum ranges from 24 to 40 inches. It commonly is more than the depth to free carbonates.

The A1 or Ap horizon has value of 3 through 5 and chroma of 1 through 3. The A2 horizon has value of 4 through 6 and chroma of 2 through 4. The A horizon is silt loam, fine sandy loam, or loam. The B2 horizon has hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 3 through 6. It ranges from strongly acid to neutral. It is dominantly clay loam but has subhorizons of loam or silty clay loam. The content of clay in the control section ranges from 25 to 35 percent.

Milford series

The Milford series consists of deep, poorly drained, moderately slowly permeable soils on uplands. These soils formed in silty or clayey lacustrine sediments. Slopes range from 0 to 2 percent.

Milford soils are similar to Bryce and Martinton soils and commonly are adjacent to those soils and to Lisbon, Saybrook, and Rantoul soils. Bryce soils are in positions on the landscape similar to those of the Milford soils. Their solum contains more clay than that of the Milford soils. The somewhat poorly drained Lisbon and Martinton and moderately well drained Saybrook soils are higher on the landscape than the Milford soils. Also, Lisbon and Saybrook soils contain less clay in the solum. The very poorly drained Rantoul soils are in depressions. Their mollic epipedon is more than 24 inches thick.

Typical pedon of Milford silty clay loam, 1,450 feet north and 70 feet east of the southwest corner of sec. 4, T. 26 N. R. 14 W.

Ap—0 to 9 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate very fine and fine subangular and angular blocky structure; firm; many fine roots; slightly acid; abrupt smooth boundary.

A12—9 to 18 inches; black (10YR 2/1) silty clay, dark gray (10YR 4/1) dry; moderate and strong very fine subangular blocky structure; firm; common fine roots; slightly acid; clear smooth boundary.

B1g—18 to 22 inches; very dark gray (10YR 3/1) silty clay, gray (10YR 5/1) dry; common medium faint dark grayish brown (2.5Y 4/2) and common medium distinct olive brown (2.5Y 4/4) mottles; moderate fine and medium angular blocky structure; very firm; common fine roots; many thin black (10YR 2/1) organic coatings on faces of peds; neutral; clear smooth boundary.

B21g—22 to 31 inches; gray (5Y 5/1) silty clay loam; many medium faint grayish brown (2.5Y 5/2) and many medium distinct dark yellowish brown (10YR 4/4) mottles; moderate medium and coarse prismatic structure parting to moderate medium and coarse angular and subangular blocky; very firm; common fine roots; many thin dark gray (5Y 4/1) pressure faces on peds; few fine dark concretions (iron and manganese oxide); common medium and coarse white concretions of calcium carbonate; neutral; clear smooth boundary.

B22g—31 to 42 inches; gray (5Y 5/1) clay loam; common medium distinct dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/6) mottles; moderate coarse prismatic structure parting to moderate medium and coarse angular blocky; very firm; few fine roots; neutral; clear smooth boundary.

B23g—42 to 50 inches; dark gray (5Y 4/1) silty clay loam stratified with thin bands of clay loam; many medium distinct dark yellowish brown (10YR 5/6) mottles; moderate coarse prismatic structure parting to moderate coarse subangular and angular blocky; firm; few fine roots; neutral; clear wavy boundary.

C—50 to 60 inches; gray (5Y 5/1) clay loam stratified with bands of fine sandy loam, silty clay loam, and silty clay; many coarse distinct yellowish brown (10YR 5/4 and 5/8) mottles; weak coarse subangular blocky structure; firm; few fine roots; neutral.

The thickness of the solum ranges from 36 to 60 inches. The thickness of the mollic epipedon ranges from 12 to 24 inches.

The A horizon has value of 2 or 3 and chroma of 2 or less. It is dominantly silty clay loam, but the range includes silty clay. The B2 horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 through 6, and chroma of 2 or less. It is silty clay loam, silty clay, or clay loam in which the content of clay ranges from 35 to 42 percent. It is slightly acid or neutral. In some pedons it has no white concretions of calcium carbonate. The C horizon is dominantly clay loam or silty clay loam but has thin layers of sandy loam to clay. It is neutral or mildly alkaline and is calcareous in some pedons.

Mokena series

The Mokena series consists of deep, somewhat poorly drained soils on uplands. These soils formed in loamy glacial outwash and in the underlying silty clay glacial till or lakebed sediments. They are moderately slowly permeable in the upper part of the subsoil and slowly permeable in the lower part and in the substratum. Slopes range from 0 to 3 percent.

Mokena soils are similar to Andres and Swygert soils and commonly are adjacent to Clarence and Swygert soils. Andres soils are in positions on the landscape similar to those of the Mokena soils. They contain less clay in the lower part of the subsoil and in the substratum than the Mokena soils. Clarence and Swygert soils are lower on the landscape than the Mokena soils. Also, their subsoil contains more clay.

Typical pedon of Mokena loam, 0 to 3 percent slopes, 1,562 feet south and 1,296 feet east of the northwest corner of sec. 1, T. 26 N., R. 13 W.

Ap—0 to 9 inches; black (10YR 2/1) loam, dark gray (10YR 4/1) dry; weak fine granular structure; friable; slightly acid; abrupt smooth boundary.

A3—9 to 14 inches; very dark gray (10YR 3/1) loam, dark grayish brown (10YR 4/2) dry; many fine very dark grayish brown (10YR 3/2) mottles; moderate fine granular structure; friable; slightly acid; clear smooth boundary.

B21t—14 to 22 inches; dark grayish brown (10YR 4/2) clay loam; many fine distinct yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate very fine and fine subangular blocky; firm; many thin very dark gray (10YR 3/1) clay films on faces of peds; slightly acid; clear smooth boundary.

B22t—22 to 28 inches; dark grayish brown (10YR 4/2) clay loam; many fine distinct yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate very fine and fine subangular blocky; firm; many thin dark gray (10YR 4/1) clay films on faces of peds; neutral; abrupt smooth boundary.

B31t—28 to 33 inches; grayish brown (2.5Y 5/2) fine sandy loam; many coarse distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to weak fine subangular blocky; friable; many thin dark gray (10YR 4/1) clay films on faces of peds; neutral; clear smooth boundary.

IIB32—33 to 41 inches; gray (2.5Y 5/1) silty clay; many medium prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to weak medium subangular blocky; firm; neutral; gradual wavy boundary.

IIC—41 to 60 inches; gray (2.5Y 5/1) silty clay; many medium prominent yellowish brown (10YR 5/6) mottles; massive; very firm; neutral.

The solum ranges from 36 to 60 inches in thickness. It is slightly acid to mildly alkaline. The thickness of the mollic epipedon ranges from 10 to 20 inches.

The A horizon has value of 2 or 3 and chroma of 1 or 2. It is dominantly loam, but the range includes silt loam and silty clay loam. The B2 horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 2 through 4. It is clay loam, sandy loam, sandy clay loam, fine sandy loam, or silty clay loam. The IIB horizon is silty clay or clay. It has free carbonates in some pedons. The content of clay in the control section ranges from 27 to 35 percent. The C horizon is silty clay or clay.

Monee series

The Monee series consists of deep, poorly drained, very slowly permeable soils in upland depressions. These soils formed in loess or silty material and in the underlying silty clay glacial till or lakebed sediments. Slopes range from 0 to 2 percent.

Monee soils are similar to Nappanee soils and commonly are adjacent to Bryce, Clarence, Nappanee, and Rowe soils. They are lower on the landscape than the adjacent soils. Clarence and Nappanee soils are somewhat poorly drained. Bryce, Clarence, and Rowe soils do not have an A2 horizon.

Typical pedon of Monee silty clay loam, 176 feet north and 2,190 feet west of the center of sec. 15, T. 24 N., R. 10 E.

Ap—0 to 8 inches; very dark gray (10YR 3/1) silty clay loam, grayish brown (10YR 5/2) dry; moderate fine and medium granular structure; friable; many fine roots; medium acid; abrupt smooth boundary.

A2—8 to 14 inches; dark grayish brown (10YR 4/2) and grayish brown (10YR 5/2) silty clay loam; moderate thin platy structure; friable; many fine roots; medium acid; clear smooth boundary.

B21t—14 to 20 inches; dark gray (10YR 4/1) and dark grayish brown (10YR 4/2) silty clay loam; many fine and medium prominent yellowish brown (10YR 5/6 and 5/8) mottles; weak medium prismatic structure parting to moderate medium angular blocky; firm; common fine roots; continuous thin very dark gray (10YR 3/1) clay films on faces of peds; slightly acid; clear smooth boundary.

IIB22t—20 to 28 inches; grayish brown (10YR 5/2) silty clay; many fine and medium distinct yellowish brown (10YR 5/4 and 5/6) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; very firm; few fine roots; continuous thin dark gray (10YR 4/1) clay films on faces of peds; neutral; clear smooth boundary.

IIB23t—28 to 39 inches; grayish brown (2.5Y 5/2) silty clay; many fine distinct yellowish brown (10YR 5/4, 5/6, and 5/8) mottles; weak medium prismatic structure parting to moderate medium angular blocky; very firm; few fine roots; many thin dark gray (10YR 4/1) clay films on faces of peds; neutral; clear smooth boundary.

IIB31t—39 to 47 inches; grayish brown (2.5Y 5/2) silty clay; many medium distinct light olive brown (2.5Y 5/4 and 5/6) mottles; weak medium prismatic structure parting to weak medium angular blocky; very firm; many thin dark gray (10YR 4/1) clay films on faces of peds; mildly alkaline; gradual smooth boundary.

IIB32t—47 to 56 inches; olive gray (5Y 5/2) silty clay; many coarse prominent yellowish brown (10YR 5/6 and 5/8) mottles; weak medium and coarse prismatic structure parting to weak coarse angular blocky; very firm; many thin gray (10YR 5/1) clay films on faces of peds; mildly alkaline; gradual smooth boundary.

IIC—56 to 60 inches; gray (5Y 5/1) and olive gray (5Y 5/2) silty clay; many coarse prominent yellowish brown (10YR 5/6) mottles; massive; very firm; weak effervescence; moderately alkaline.

The thickness of the solum ranges from 30 to 60 inches. The mollic epipedon is 7 to 10 inches thick.

The A horizon is dominantly silty clay loam but in some pedons is silt loam or loam. It is strongly acid to neutral. The A1 or Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The A2 horizon has hue of 10YR, value of 4 through 6, and chroma of 2 or less. The B2 horizon has hue of 10YR, 2.5YR, or 5Y, value of 4 through 6, and chroma of 2 or less. It ranges from medium acid in the upper part to moderately alkaline in the lower part. It is dominantly silty clay, but the range includes silty clay loam and clay. The C horizon is dominantly silty clay but in some pedons is silty clay loam or clay. It is neutral to moderately alkaline and is calcareous in many pedons.

Morocco series

The Morocco series consists of deep, somewhat poorly drained, rapidly permeable soils on outwash plains. These soils formed in wind- or water-deposited sandy material. Slopes range from 0 to 2 percent.

Morocco soils are similar to Watseka soils and commonly are adjacent to Gilford, Granby, Oakville, Sparta, and Watseka soils. Gilford, Granby, Sparta, and Watseka soils have a mollic epipedon. The very poorly drained Gilford and Granby soils are in shallow depressions and drainageways. Also, Gilford soils contain more clay in the solum than the Morocco soils. The well drained Oakville and excessively drained Sparta soils are higher on the landscape than the Morocco soils. Watseka soils are in positions on the landscape similar to those of the Morocco soils.

Typical pedon of Morocco fine sand, 2,286 feet north and 33 feet east of the southwest corner of sec. 13, T. 29 N., R. 11 W.

A1—0 to 4 inches; very dark gray (10YR 3/1) fine sand, grayish brown (10YR 5/2) dry; weak fine granular structure; very friable; many fine roots; strongly acid; clear smooth boundary.

A2—4 to 10 inches; brown (10YR 5/3) fine sand; common fine faint grayish brown (10YR 5/2) and few fine prominent yellowish red (5YR 5/8) mottles; single grained; loose; many fine roots; common thin dark gray (10YR 4/1) organic coatings on sand grains; very strongly acid; gradual smooth boundary.

B21—10 to 22 inches; pale brown (10YR 6/3) fine sand; many medium faint light brownish gray (10YR 6/2) and few fine distinct strong brown (7.5YR 5/8) mottles; single grained; loose; common fine roots; very strongly acid; clear smooth boundary.

B22—22 to 37 inches; very pale brown (10YR 7/4) fine sand; common fine faint light brownish gray (10YR 6/2) mottles; single grained; loose; common fine roots; very strongly acid; gradual smooth boundary.

C—37 to 60 inches; very pale brown (10YR 7/4) fine sand; common fine faint yellow (10YR 7/6) mottles; single grained; loose; few fine roots; strongly acid.

The thickness of the solum ranges from 24 to 48 inches. The A1 or Ap horizon has value of 3 through 6 and chroma of 1 through 3. The A2 horizon has hue of 10YR, value of 4 through 6, and chroma of 2 through 6. The A horizon is dominantly fine sand, but the range includes loamy fine sand, loamy sand, and sand. The B2 and C horizons are medium acid to very strongly acid. The B2 horizon dominantly has hue of 10YR but in some pedons has hue of 7.5YR, 5YR, or 2.5YR. It has value of

5 through 7 and chroma of 1 through 8. The C horizon is fine sand or sand.

Nappanee series

The Nappanee series consists of deep, somewhat poorly drained, very slowly permeable soils on uplands. These soils formed in loess or silty material and in the underlying silty clay glacial till. Slopes range from 1 to 6 percent.

These soils have higher chroma directly below the surface layer than is definitive for the Nappanee series. This difference, however, does not significantly affect the use or behavior of the soils.

Nappanee soils are similar to Clarence soils and commonly are adjacent to Bryce, Chatsworth, Clarence, and Rowe soils. The poorly drained Bryce and Rowe soils are in shallow depressions and drainageways. They have a mollic epipedon. The moderately well drained Chatsworth soils generally are more sloping than the Nappanee soils. Clarence soils have a mollic epipedon. Their positions on the landscape are similar to those of the Nappanee soils.

Typical pedon of Nappanee silt loam, 1 to 6 percent slopes, 2,060 feet north and 2,080 feet east of the southwest corner of sec. 20, T. 24 N., R. 10 E.

A1—0 to 4 inches; very dark grayish brown (10YR 3/2) silt loam, light brownish gray (10YR 6/2) dry; moderate fine granular structure; friable; many fine roots; medium acid; clear smooth boundary.

A2—4 to 8 inches; brown (10YR 5/3) silt loam; weak fine platy structure; friable; many fine roots; strongly acid; clear smooth boundary.

B21t—8 to 13 inches; brown (10YR 5/3) silty clay loam; moderate fine subangular blocky structure; firm; common fine roots; many thin grayish brown (10YR 5/2) clay films on faces of peds; common fine dark accumulations (iron and manganese oxide); strongly acid; clear smooth boundary.

B22t—13 to 23 inches; grayish brown (10YR 5/2) silty clay; many fine faint yellowish brown (10YR 5/4) and few fine faint yellowish brown (10YR 5/6) mottles; weak fine prismatic structure parting to weak medium subangular blocky; very firm; common fine roots; many thin grayish brown (10YR 5/2) clay films on faces of peds; common fine dark accumulations (iron and manganese oxide); strongly acid; clear smooth boundary.

B3—23 to 32 inches; grayish brown (2.5Y 5/2) silty clay; many fine distinct yellowish brown (10YR 5/4) and few fine distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure; very firm; few fine roots; many fine dark accumulations (iron and manganese oxide); medium acid; gradual wavy boundary.

C1—32 to 45 inches; mottled grayish brown (2.5Y 5/2), gray (10YR 6/1), and yellowish brown (10YR 5/6) silty clay; massive; very firm; common fine dark accumulations (iron and manganese oxide); strong effervescence; moderately alkaline; gradual wavy boundary.

C2—45 to 60 inches; mottled grayish brown (2.5Y 5/2) and gray (10YR 6/1) silty clay; massive; very firm; common fine dark accumulations (iron and manganese oxide); violent effervescence; moderately alkaline.

The thickness of the solum and the depth to free carbonates range from 18 to 40 inches. The A1 or Ap horizon has value of 2 through 4 and chroma of 1 through 3. The A2 horizon has value of 4 through 6 and chroma of 2 through 4. Some pedons do not have an A2 horizon. The A horizon is dominantly silt loam, but the range includes loam and silty clay loam. The B2 horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 1 through 3. It ranges from strongly acid to neutral. It is dominantly silty clay, but some subhorizons are silty clay loam or clay. The content of clay in the control section ranges from 45 to 55 percent. The C horizon is silty clay or clay in which the content of clay ranges from 40 to 55 percent.

Oakville series

The Oakville series consists of deep, well drained, rapidly permeable soils on outwash plains, lake plains, and glacial till plains. These soils formed in wind-deposited sand or water-deposited sand reworked by the wind. Slopes range from 1 to 12 percent.

Oakville soils are similar to Sparta soils and commonly are adjacent to Granby, Morocco, and Watseka soils. Granby, Sparta, and Watseka soils have a mollic epipedon. The very poorly drained Granby soils are in shallow depressions and drainageways. The somewhat poorly drained Morocco and Watseka soils are lower on the landscape than the Oakville soils. Sparta soils are in positions on the landscape similar to those of the Oakville soils.

Typical pedon of Oakville fine sand, 5 to 12 percent slopes, 115 feet south and 160 feet east of the northwest corner of sec. 24, T. 29 N., R. 11 W.

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) fine sand; single grained; loose; many fine roots; slightly acid; clear smooth boundary.

B1—5 to 8 inches; brownish yellow (10YR 6/6) fine sand; common thin dark yellowish brown (10YR 4/4) organic coatings on sand grains; single grained; loose; common fine roots; slightly acid; clear smooth boundary.

B2—8 to 22 inches; mottled dark yellowish brown (10YR 4/4) and brownish yellow (10YR 6/6) fine sand; single grained; loose; common fine roots; slightly acid; diffuse wavy boundary.

C—22 to 60 inches; brownish yellow (10YR 6/6) fine sand; single grained; loose; few fine roots; slightly acid.

The thickness of the solum ranges from 18 to 40 inches. Reaction ranges from neutral to medium acid throughout the profile.

The Ap or A1 horizon has value of 3 or 4 and chroma of 1 through 4. Some pedons have an A2 horizon. The A and B2 horizons are dominantly fine sand, but the range includes sand and loamy fine sand. The B2 horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 through 6. The C horizon is fine sand or sand.

Odell series

The Odell series consists of deep, somewhat poorly drained, moderately slowly permeable soils on uplands. These soils formed dominantly in loam glacial till but in some areas also formed in a thin mantle of loess or silty material. Slopes range from 0 to 2 percent.

Odell soils are similar to Corwin, Lisbon, and Selma soils and commonly are adjacent to Corwin and Selma soils. The moderately well drained Corwin soils are more sloping than the Odell soils. Lisbon soils are in positions on the landscape similar to those of the Odell soils. Their subsoil contains less sand than that of the Odell soils. The poorly drained Selma soils are in shallow depressions and drainageways.

Typical pedon of Odell silt loam, 1,320 feet south and 1,430 feet east of the northwest corner of sec. 25, T. 26 N., R. 11 W.

Ap—0 to 7 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate very fine granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

A12—7 to 12 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate very fine granular structure; friable; many fine roots; slightly acid; clear smooth boundary.

IIB1—12 to 15 inches; dark grayish brown (10YR 4/2) clay loam; moderate very fine subangular blocky structure parting to weak very fine granular; friable; common fine roots; many thin very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; clear smooth boundary.

IIB21t—15 to 20 inches; dark brown (10YR 4/3) clay loam; common fine faint dark grayish brown (10YR 4/2) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; common fine roots; many very dark gray (10YR 3/1) clay films on faces of peds; slightly acid; clear smooth boundary.

IIB22t—20 to 26 inches; brown (10YR 5/3) clay loam; common fine faint yellowish brown (10YR 5/4) and grayish brown (10YR 5/2) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; many very dark gray (10YR 3/1) clay films on faces of peds; neutral; clear smooth boundary.

IIB23t—26 to 35 inches; brown (10YR 5/3) clay loam; many fine faint yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; common dark grayish brown (10YR 4/2) clay films on faces of peds; slight effervescence; mildly alkaline; clear smooth boundary.

IIB3—35 to 39 inches; yellowish brown (10YR 5/4) and pale brown (10YR 6/3) loam; weak coarse prismatic structure; firm; few fine roots; slight effervescence; mildly alkaline; clear smooth boundary.

IIC—39 to 60 inches; mottled yellowish brown (10YR 5/4) and light brownish gray (10YR 6/2) loam; massive; firm; slight effervescence; mildly alkaline.

The thickness of the solum ranges from 30 to 42 inches. The depth to free carbonates ranges from 20 to 40 inches. The thickness of the mollic epipedon ranges from 10 to 18 inches.

The A horizon has value of 2 or 3 and chroma of 1 or 2. It is dominantly silt loam, but the range includes loam. The B2 horizon has hue of 10YR, value of 4 through 6, and chroma of 2 through 6. It is slightly acid or medium acid in the upper part and neutral or mildly alkaline in the lower part. It is dominantly clay loam, but the range includes loam and silty clay loam. The C horizon is dominantly loam, but the range includes silt loam high in content of sand.

Onarga series

The Onarga series consists of deep, well drained soils on outwash plains. These soils formed in loamy and sandy glacial outwash. They are moderately permeable in the subsoil and rapidly permeable in the substratum. Slopes range from 1 to 5 percent.

Onarga soils are similar to Alvin soils and commonly are adjacent to Pella, Ridgeville, Selma, and Sparta soils. Alvin soils lack a mollic epipedon. Their positions on the landscape are similar to those of the Onarga soils. The poorly drained Pella and Selma soils are in shallow depressions and drainageways. The solum of Pella soils contains less sand than that of the Onarga soils, and the solum of Selma soils contains more clay. The somewhat poorly drained Ridgeville soils are lower on the landscape than the Onarga soils. The excessively drained Sparta soils are higher on the landscape than the Onarga soils. Also, their solum contains more sand.

Typical pedon of Onarga fine sandy loam, 1 to 5 percent slopes, 2,032 feet south and 33 feet west of the northeast corner of sec. 17, T. 26 N., R. 10 E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) fine sandy loam, dark grayish brown (10YR 4/2) dry; weak very fine granular structure; very friable; medium acid; abrupt smooth boundary.

A12—8 to 13 inches; very dark grayish brown (10YR 3/2) fine sandy loam, dark grayish brown (10YR 4/2) dry; weak fine granular structure; very friable; many fine roots; medium acid; clear smooth boundary.

B21t—13 to 23 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak fine prismatic structure parting to weak fine subangular blocky; friable; common fine roots; many thin dark yellowish brown (10YR 4/4) clay films on sand grains; strongly acid; clear wavy boundary.

B22—23 to 29 inches; yellowish brown (10YR 5/4) fine sandy loam; weak medium prismatic structure parting to weak fine subangular blocky; very friable; few fine roots; very strongly acid; gradual smooth boundary.

B3—29 to 33 inches; brownish yellow (10YR 6/6) loamy fine sand; weak medium subangular blocky structure; very friable; few fine roots; strongly acid; clear wavy boundary.

C—33 to 60 inches; mottled yellowish brown (10YR 5/6) and light yellowish brown (10YR 6/4) stratified loamy fine sand and fine sand; single grained; loose; slightly acid.

The thickness of the solum ranges from 30 to 50 inches. The thickness of the mollic epipedon ranges from 10 to 20 inches.

The A horizon has value of 2 or 3 and chroma of 1 through 3. It is fine sandy loam or sandy loam. The B2 horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 through 6. It ranges from very strongly acid to neutral. It is dominantly fine sandy loam, but the range includes loam and sandy loam. In the control section, the content of clay is 15 to 18 percent and the content of sand ranges from about 45 to 70 percent. The C horizon is dominantly stratified loamy fine sand and fine sand but in some pedons has strata of fine sandy loam, loamy sand, sandy loam, or loam. It is medium acid or slightly acid.

Pella series

The Pella series consists of deep, poorly drained, moderately permeable soils on outwash plains and lake plains. These soils formed in loamy material and in the underlying loamy glacial outwash. Slopes range from 0 to 2 percent.

Pella soils are similar to Harco and Selma soils and commonly are adjacent to those soils and to Barrington, La Hogue, and Ridgeville soils. The moderately well drained Barrington and somewhat poorly drained Harco, La Hogue, and Ridgeville soils are higher on the landscape than the Pella soils. Also, the solum of La Hogue soils contains more sand, and that of Ridgeville soils contains more sand and less clay. Selma soils are in shallow depressions and drainageways. Their solum contains more sand than that of the Pella soils.

Typical pedon of Pella clay loam, 100 feet south and 615 feet east of the center of sec. 16, T. 26 N., R. 10 E.

Ap—0 to 6 inches; black (10YR 2/1) clay loam, very dark gray (10YR 3/1) dry; moderate medium angular blocky structure; firm; common fine roots; about 26 percent sand, by weight; neutral; abrupt smooth boundary.

A12—6 to 13 inches; black (10YR 2/1) clay loam, very dark gray (10YR 3/1) dry; moderate and strong medium granular structure; friable; common fine roots; about 25 percent sand, by weight; few small concretions (iron and manganese oxide); neutral; clear smooth boundary.

B1—13 to 17 inches; very dark gray (10YR 3/1) clay loam; moderate and strong medium and coarse granular structure; firm; common fine roots; about 25 percent sand, by weight; few small concretions (iron and manganese oxide); common black krotovinas; neutral; clear smooth boundary.

B21tg—17 to 25 inches; olive gray (5Y 4/2) clay loam; few fine distinct yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure parting to moderate medium angular and subangular blocky; firm; common fine roots; thin discontinuous olive gray (5Y 5/2) clay films on faces of peds; about 25 percent sand, by weight; few small concretions (iron and manganese oxide); common black krotovinas; mildly alkaline; clear smooth boundary.

B22tg—25 to 31 inches; olive gray (5Y 5/2) silty clay loam; common fine prominent yellowish brown (10YR 5/8) mottles; moderate and strong medium prismatic structure parting to strong medium angular blocky; firm; common fine roots; thin discontinuous gray (5Y 5/1) clay films on faces of peds; about 15 percent sand, by weight; few small concretions (iron and manganese oxide); common black krotovinas; mildly alkaline; clear smooth boundary.

IIB3tg—31 to 38 inches; gray (5Y 5/1) stratified loam and silt loam; many medium distinct yellowish brown (10YR 5/6 and 5/8) mottles; weak medium prismatic structure parting to weak medium angular and subangular blocky; firm; few fine roots; thin discontinuous gray (5Y 5/1) clay films on faces of prisms; about 25 percent sand, by weight; few concretions (iron and manganese oxide); common black krotovinas; moderately alkaline; gradual wavy boundary.

IIC1g—38 to 51 inches; gray (5Y 5/1) stratified sandy loam, silt loam, and clay loam; many coarse prominent yellowish brown (10YR 5/6 and 5/8) mottles; massive; friable and firm; few fine roots; about 25 percent sand, by weight; few concretions (iron and manganese oxide); common krotovinas; slight effervescence (12 percent calcium carbonate equivalent); moderately alkaline; clear wavy boundary.

IIC2g—51 to 60 inches; olive gray (5Y 5/2) stratified sandy loam, silt loam, and clay loam; many medium prominent strong brown (7.5YR 5/6) and yellowish brown (10YR 5/8) mottles; massive; firm; few concretions (iron and manganese oxide); few krotovinas; strong effervescence (24 percent calcium carbonate equivalent); moderately alkaline.

The thickness of the solum ranges from 30 to 50 inches. The depth to free carbonates ranges from 16 to 40 inches. The thickness of the mollic epipedon ranges from 10 to 24 inches.

The A horizon has hue of 10YR or is neutral in hue. It has value of 2 or 3 and chroma of 2 or less. It is dominantly clay loam, but the range includes silty clay loam and silt loam. The B2 horizon has hue of 5Y, 2.5Y, or 10YR, value of 4 through 6, and chroma of 1 or 2. It is clay loam, silty clay loam, or silty clay. It is neutral or mildly alkaline. The IIB3 horizon has hue of 5Y, 2.5Y, or 10YR, value of 5 or 6, and chroma of 1 through 8. It is dominantly silty clay loam, clay loam, silt loam, or loam but in some pedons has strata of sandy loam, loamy sand, or sand. It is mildly alkaline or moderately alkaline and has free carbonates in many pedons.

Peotone series

The Peotone series consists of deep, very poorly drained, moderately slowly permeable soils in upland depressions. These soils formed in local alluvial sediments derived from surrounding slopes and in the underlying silty clay loam or silty clay glacial till or lakebed sediments. Slopes range from 0 to 2 percent.

Peotone soils are similar to Rantoul soils and commonly are adjacent to Milford and Pella soils. Milford and Pella soils have a mollic epipedon that is less than 24 inches thick. They are poorly drained and are higher on the landscape than the Peotone soils. Also, Pella soils contain less clay in the solum. Rantoul soils contain more clay in the solum. Their positions on the landscape are similar to those of the Peotone soils.

Typical pedon of Peotone silty clay loam, 740 feet east and 260 feet north of the southwest corner of sec. 7, T. 28 N., R. 10 E.

Ap1—0 to 8 inches; black (N 2/0) silty clay loam, very dark gray (10YR 3/1) dry; moderate very fine granular structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

Ap2—8 to 12 inches; black (N 2/0) silty clay loam, very dark gray (10YR 3/1) dry; strong medium angular blocky structure; firm; many fine roots; slightly acid; abrupt smooth boundary.

B21g—12 to 19 inches; black (N 2/0) silty clay, very dark gray (10YR 3/1) dry; weak medium prismatic structure parting to moderate very fine and fine subangular blocky; firm; common fine roots; many thin black (N 2/0) organic coatings on faces of peds; neutral; clear smooth boundary.

B22g—19 to 24 inches; very dark gray (5Y 3/1) silty clay, very dark gray (10YR 3/1) dry; common fine distinct olive brown (2.5Y 4/4) and dark grayish brown (2.5Y 4/2) mottles; moderate medium prismatic structure parting to weak very fine and fine subangular blocky; firm; common fine roots; many thin black (5Y 2/1) organic coatings on faces of peds; neutral; clear smooth boundary.

B23g—24 to 34 inches; very dark gray (5Y 3/1) silty clay, very dark gray (10YR 3/1) dry; common fine distinct dark grayish brown (2.5Y 4/2) and common fine prominent yellowish brown (10YR 5/6) mottles; strong medium prismatic structure parting to moderate fine and medium subangular blocky; firm; few fine roots; common thin black (5Y 2/1) organic coatings on faces of peds; black (N 2/0) krotovinas; slight effervescence; mildly alkaline; gradual smooth boundary.

B24g—34 to 44 inches; gray (5Y 5/1) silty clay loam; many fine prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure; firm; few fine roots; few thin black (5Y 2/1) organic coatings on faces of peds; black (N 2/0) krotovinas; slight effervescence; mildly alkaline; gradual wavy boundary.

B3g—44 to 52 inches; gray (5Y 5/1) silty clay loam; many fine prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure; firm; few fine roots; few thin dark gray (N 4/0) organic coatings on faces of peds; few snail shells; slight effervescence; mildly alkaline; gradual wavy boundary.

Cg—52 to 60 inches; gray (5Y 5/1) silty clay loam; many fine faint olive brown (2.5Y 4/4) mottles; massive; firm; few snail shells; slight effervescence; mildly alkaline.

The thickness of the solum ranges from 38 to 60 inches. The thickness of the mollic epipedon ranges from 24 to 36 inches.

The A horizon has hue of 10YR or is neutral in hue. It has value of 2 or 3 and chroma of 1 or less. The B2 horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 2 through 4 in the upper part and 4 through 6 in the lower part and has chroma of 2 or less. It is slightly acid to mildly alkaline and in some pedons does not have free carbonates in the lower part. It is silty

clay loam or silty clay. The content of clay in the control section ranges from 35 to 45 percent. The C horizon is dominantly silty clay loam but ranges to silt loam or silty clay and is stratified in some pedons. It ranges from neutral to moderately alkaline and in some pedons does not have free carbonates.

Rantoul series

The Rantoul series consists of deep, very poorly drained, very slowly permeable soils in upland depressions. These soils formed in local alluvial sediments derived from surrounding slopes and in the underlying silty clay glacial till or lakebed sediments. Slopes range from 0 to 2 percent.

Rantoul soils are similar to Peotone soils and commonly are adjacent to Bryce, Milford, and Rowe soils. The poorly drained Bryce, Milford, and Rowe soils are higher on the landscape than the Rantoul soils. Their mollic epipedon is less than 24 inches thick. The solum of Peotone soils contains less clay than that of the Rantoul soils.

Typical pedon of Rantoul silty clay, 1,500 feet west and 42 feet north of the southeast corner of sec. 16, T. 27 N., R. 14 W.

Ap—0 to 9 inches; black (N 2/0) silty clay, very dark gray (N 3/0) dry; moderate fine subangular blocky structure parting to weak medium granular; firm; many fine roots; neutral; abrupt smooth boundary.

A12—9 to 22 inches; black (N 2/0) silty clay, very dark gray (N 3/0) dry; weak fine and medium granular structure; firm; many fine roots; neutral; gradual smooth boundary.

B1g—22 to 31 inches; very dark gray (N 3/0) silty clay, dark gray (N 4/0) dry; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; very firm; common fine roots; neutral; clear smooth boundary.

B2g—31 to 43 inches; gray (5Y 5/1) silty clay; many fine distinct light olive brown (2.5Y 5/4) mottles; moderate medium prismatic structure parting to coarse medium subangular blocky; very firm; common fine roots; many thin dark gray (N 4/0) and very dark gray (N 3/0) organic coatings on faces of peds; black (N 2/0) krotovinas in the lower part; few snail shells; mildly alkaline; clear smooth boundary.

B3g—43 to 60 inches; gray (5Y 5/1) silty clay; many medium prominent strong brown (7.5Y 5/8) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; many thin dark gray (N 4/0) organic coatings on faces of peds; many fine white concretions of calcium carbonate; mildly alkaline.

The thickness of the solum ranges from 36 to more than 60 inches. The depth to free carbonates ranges from 34 to 60 inches. The thickness of the mollic epipedon ranges from 24 to 36 inches.

The A horizon has hue of 10YR or is neutral in hue. It has value of 2 or 3 and chroma of less than 2. It is dominantly silty clay, but the range includes silty clay loam. The B2 horizon has hue of 5Y or 2.5Y, value of 4 or 5, and chroma of 2 or less. It is silty clay or clay. It ranges from slightly acid to moderately alkaline.

Reddick series

The Reddick series consists of deep, poorly drained soils on outwash plains, stream terraces, and lake plains. These soils formed in loamy glacial outwash and in the underlying clayey glacial till or lacustrine material. They are moderately permeable in the upper part of the subsoil and slowly or very slowly permeable in the lower part and in the substratum. Slopes range from 0 to 2 percent.

Reddick soils are similar to Ashkum, Bryce, Milford, and Selma soils and commonly are adjacent to those soils and to Elliott soils. They are in positions on the landscape similar to those of the similar soils. The subsoil of Ashkum, Bryce, and Milford soils contains more clay than that of the Reddick soils. The somewhat poorly drained Elliott soils are higher on the landscape than the Reddick soils. Selma soils contain more clay in the lower part of the subsoil than the Reddick soils.

Typical pedon of Reddick clay loam, 1,866 feet south and 726 feet east of the northwest corner of sec. 13, T. 29 N., R. 13 W.

Ap—0 to 7 inches; black (10YR 2/1) clay loam, very dark gray (10YR 3/1) dry; weak medium granular structure; firm; many fine roots; neutral; abrupt smooth boundary.

A12—7 to 11 inches; very dark gray (10YR 3/1) clay loam, dark gray (10YR 4/1) dry; few fine faint dark brown (10YR 4/3) mottles; moderate fine subangular blocky structure; firm; many fine roots; neutral; clear smooth boundary.

B1tg—11 to 16 inches; grayish brown (2.5Y 5/2) clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium and coarse subangular blocky structure; firm; common fine roots; many thin very dark gray (10YR 3/1) clay films on faces of peds; neutral; clear smooth boundary.

B21tg—16 to 21 inches; grayish brown (2.5Y 5/2) clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate coarse subangular blocky structure; firm; common fine roots; common thin very dark gray (10YR 3/1) clay films on faces of peds; neutral; clear smooth boundary.

B22g—21 to 28 inches; grayish brown (2.5Y 5/2) clay loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; firm; common fine roots; mildly alkaline; clear smooth boundary.
B31g—28 to 40 inches; grayish brown (2.5Y 5/2) clay loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to weak coarse angular blocky; firm; few fine roots; mildly alkaline; clear smooth boundary.
IIB32g—40 to 45 inches; mottled gray (5Y 6/1) and dark brown (10YR 4/3) silty clay; weak coarse prismatic structure; very firm; few fine very dark brown accumulations (iron and manganese oxide); mildly alkaline; clear smooth boundary.
IICg—45 to 60 inches; mottled gray (5Y 6/1) and dark brown (10YR 4/3) silty clay; massive; very firm; slight effervescence; mildly alkaline.

The thickness of the solum ranges from 35 to 55 inches. It commonly is the same as the depth to free carbonates. The thickness of the mollic epipedon ranges from 10 to 24 inches.

The A horizon has hue of 10YR or is neutral in hue. It has value of 2 or 3 and chroma of 2 or less. It is dominantly clay loam, but the range includes loam and silty clay loam. The B2 and IIB3 horizons have hue of 2.5Y or 5Y, value of 4 through 6, and chroma of 2 or less. The B2 horizon is dominantly clay loam but in some pedons is silty clay loam or has thin layers of loamy sand or thin layers in which the content of gravel is as much as 50 percent. It is neutral or mildly alkaline. The IIB3 horizon is silty clay, silty clay loam, or clay. Some pedons have free carbonates. The C horizon is silty clay, silty clay loam, or clay.

Ridgeville series

The Ridgeville series consists of deep, somewhat poorly drained soils on outwash plains. These soils formed in loamy and sandy glacial outwash. They are moderately permeable in the upper part and rapidly permeable in the lower part. Slopes range from 0 to 2 percent.

Ridgeville soils are similar to Roby and Selma soils and commonly are adjacent to Gilford, Onarga, Pella, and Selma soils. The very poorly drained Gilford and poorly drained Pella and Selma soils are in shallow depressions and drainageways. Also, the solum of Pella soils contains less sand and more clay than that of the Ridgeville soils, and the solum of Selma soils contains more clay. The well drained Onarga soils are higher on the landscape than the Ridgeville soils. Roby soils lack a mollic epipedon. Their positions on the landscape are similar to those of the Ridgeville soils.

Typical pedon of Ridgeville fine sandy loam, 2,084 feet south and 30 feet east of the northwest corner of sec. 19, T. 26 N., R. 12 W.

Ap—0 to 8 inches; very dark brown (10YR 2/2) fine sandy loam, dark grayish brown (10YR 4/2) dry; weak fine and medium granular structure; very friable; many fine roots; slightly acid; gradual smooth boundary.
A12—8 to 16 inches; very dark gray (10YR 3/1) fine sandy loam, dark grayish brown (10YR 4/2) dry; weak fine and medium granular structure; very friable; many fine roots; medium acid; clear wavy boundary.
B1—16 to 25 inches; dark grayish brown (10YR 4/2) fine sandy loam; common fine faint brown (10YR 5/3) and dark gray (10YR 4/1) mottles; weak medium granular structure in the upper part and weak very fine and fine subangular blocky structure in the lower part; friable; common fine roots; medium acid; clear smooth boundary.
B21t—25 to 32 inches; grayish brown (10YR 5/2) sandy clay loam; many fine distinct yellowish brown (10YR 5/6) mottles; moderate fine and medium subangular blocky structure; firm; common fine roots; few fine dark brown (7.5YR 3/2) concretions (iron and manganese oxide); medium acid; clear smooth boundary.
B22t—32 to 40 inches; grayish brown (10YR 5/2) fine sandy loam; many medium distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; firm; few fine roots; many thin gray (10YR 5/1) clay films on faces of peds; many fine dark brown (7.5YR 3/2) concretions (iron and manganese oxide); slightly acid; clear wavy boundary.
B3—40 to 47 inches; yellowish brown (10YR 5/8) loamy fine sand; many medium prominent light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; very friable; few fine roots; few fine dark brown (7.5YR 3/2) concretions (iron and manganese oxide); neutral; clear wavy boundary.
C—47 to 60 inches; light brownish gray (10YR 6/2) fine sand; common fine distinct yellowish brown (10YR 5/6) mottles; single grained; loose; neutral.

The thickness of the solum ranges from 40 to 55 inches. The thickness of the mollic epipedon ranges from 10 to 18 inches.

The A horizon has value of 2 or 3 and chroma of 1 or 2. It is dominantly fine sandy loam, but the range includes loam and loamy fine sand. The B2 horizon has hue of 10YR, value of 4 or 5, and chroma of 2 through 4. It is medium acid or slightly acid. It is dominantly sandy clay loam and fine sandy loam, but the range includes loam. In the control section, the content of clay is 15 to 18 percent and the content of sand ranges from 45 to

70 percent. The C horizon is dominantly fine sand or sand but in some pedons has thin strata of loam, sandy loam, loamy fine sand, coarse sand, or fine gravel. It is neutral or slightly acid.

Roby series

The Roby series consists of deep, somewhat poorly drained soils on outwash plains. These soils formed in loamy and sandy glacial outwash. They are moderately permeable in the upper part and moderately rapidly permeable in the lower part. Slopes range from 0 to 2 percent.

Roby soils are similar to Ridgeville soils and commonly are adjacent to Alvin and Selma soils. The well drained Alvin soils are higher on the landscape than the Roby soils. Ridgeville and Selma soils have a mollic epipedon. Ridgeville soils are in positions on the landscape similar to those of the Roby soils. Selma soils are poorly drained and are in shallow depressions and drainageways. Their solum contains more clay than that of the Roby soils.

Typical pedon of Roby loamy fine sand, 2,475 feet north and 1,470 feet east of the southwest corner of sec. 33, T. 26 N., R. 12 W.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) loamy fine sand, light brownish gray (10YR 6/2) dry; moderate very fine granular structure; very friable; many fine roots; neutral; abrupt smooth boundary.

A2—8 to 11 inches; light yellowish brown (10YR 6/4) loamy fine sand; weak medium platy structure; friable; many fine roots; neutral; clear smooth boundary.

B21t—11 to 18 inches; yellowish brown (10YR 5/4) fine sandy loam; common fine faint light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; friable; common fine roots; common thin light yellowish brown (10YR 6/4) clay films on faces of peds; slightly acid; clear smooth boundary.

B22t—18 to 25 inches; yellowish brown (10YR 5/6) fine sandy loam; common fine faint light brownish gray (10YR 6/2) and common fine distinct strong brown (7.5YR 5/6) mottles; weak medium prismatic structure parting to weak medium subangular blocky; friable; common fine roots; common thin yellowish brown (10YR 5/4) clay films on faces of peds; slightly acid; clear smooth boundary.

B3—25 to 54 inches; yellowish brown (10YR 5/4) loamy fine sand; common fine faint light brownish gray (10YR 6/2) and many fine faint pale brown (10YR 6/3) mottles; single grained; loose; few fine roots; slightly acid; clear smooth boundary.

C—54 to 60 inches; mottled dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/4) stratified loamy fine sand and fine sandy loam; many coarse faint light brownish gray (10YR 6/2) mottles; weak coarse subangular blocky structure; friable; slightly acid.

The thickness of the solum ranges from 30 to more than 60 inches. The A1 or Ap horizon has value of 4 or 5 and chroma of 2 or 3. The A2 horizon has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. The A horizon is loamy fine sand or fine sandy loam. The B2 horizon has hue of 10YR, value of 4 or 5, and chroma of 2 through 6. It is medium acid to neutral. It is dominantly fine sandy loam, but the range includes sandy loam and loam. In the control section, the content of clay ranges from 12 to 18 percent and the content of sand from 45 to 80 percent.

The C horizon is dominantly stratified loamy fine sand and fine sandy loam but ranges from sand to loam and in some pedons has thin strata of gravel. It is medium acid to mildly alkaline and in some pedons has free carbonates.

Rowe series

The Rowe series consists of deep, poorly drained, very slowly permeable soils on uplands. These soils formed in colluvial sediments and in the underlying silty clay glacial till. Slopes range from 0 to 2 percent.

Rowe soils are similar to Bryce soils and commonly are adjacent to Clarence, Monee, Nappanee, and Rantoul soils. Bryce soils do not have an argillic horizon. The somewhat poorly drained Clarence and Nappanee soils are higher on the landscape than the Rowe soils. Monee soils and the very poorly drained Rantoul soils are in depressions below the Rowe soils. Also, Monee soils do not have a mollic epipedon.

Typical pedon of Rowe silty clay loam, 149 feet north and 432 feet west of the southeast corner of sec. 31, T. 24 N., R. 10 E.

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; very dark gray (10YR 3/1) organic coatings on faces of peds; many fine roots; neutral; abrupt smooth boundary.

A12—7 to 14 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; weak medium and fine subangular blocky structure parting to moderate fine granular; friable; very dark gray (10YR 3/1) organic coatings on faces of peds; many fine roots; neutral; clear smooth boundary.

IIB1t—14 to 20 inches; grayish brown (2.5Y 5/2) silty clay; many fine distinct yellowish brown (10YR 5/6) mottles; moderate medium and fine subangular blocky structure; friable; many dark gray (10YR 4/1) clay films and very dark gray (10YR 3/1) organic coatings on faces of peds; few fine roots; slightly acid; clear smooth boundary.

IIB21t—20 to 29 inches; grayish brown (2.5Y 5/2) clay; common fine distinct yellowish brown (10YR 5/8) and common fine faint light olive brown (2.5Y 5/6) mottles; moderate coarse and medium prismatic structure parting to moderate medium and fine subangular blocky; firm; many dark grayish brown (2.5Y 4/2) clay films and common very dark gray (10YR 3/1) organic coatings on faces of peds; dark gray (10YR 4/1) slickensides; few fine roots; neutral; clear smooth boundary.

IIB22t—29 to 40 inches; grayish brown (2.5Y 5/2) silty clay; common fine distinct yellowish brown (10YR 5/6 and 5/8) mottles; moderate coarse and medium prismatic structure parting to moderate medium subangular blocky; firm; many dark grayish brown (2.5Y 4/2) clay films on faces of peds; few very dark gray (10YR 3/1) organic coatings along root channels; dark grayish brown (2.5Y 4/2) slickensides; few fine roots; mildly alkaline; gradual smooth boundary.

IIB3t—40 to 48 inches; grayish brown (2.5Y 5/2) silty clay; many medium distinct yellowish brown (10YR 5/6 and 5/8) and common fine distinct gray (5Y 5/1) mottles; moderate coarse and medium prismatic structure; very firm; common dark grayish brown (2.5Y 4/2) clay films on faces of peds; weak effervescence; common fine white accumulations of calcium carbonate; slight effervescence; mildly alkaline; gradual wavy boundary.

IIC—48 to 60 inches; mottled yellowish brown (10YR 5/6), gray (5Y 5/1), and dark grayish brown (2.5Y 4/2) silty clay; massive; very firm; few fine dark accumulations (iron and manganese oxide); common fine white accumulations of calcium carbonate; slight effervescence; moderately alkaline.

The thickness of the solum ranges from 30 to 60 inches. It commonly is more than the depth to free carbonates. The thickness of the mollic epipedon ranges from 10 to 24 inches.

The A horizon has value of 2 or 3 and chroma of 2 or less. It is dominantly silty clay loam, but the range includes silty clay. The B2 horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 through 6, and chroma of 3 or less. It ranges from slightly acid to moderately alkaline. It is dominantly silty clay, but the range includes clay. The content of clay in the control section ranges from 48 to 60 percent. The C horizon is silty clay or clay.

Ruark series

The Ruark series consists of deep, poorly drained, moderately slowly permeable soils on outwash plains. These soils formed in loamy glacial outwash. Slopes range from 0 to 2 percent.

Ruark soils are similar to Selma soils and commonly are adjacent to La Hogue, Selma, and Wea soils. The adjacent soils are higher on the landscape than the Ruark soils. They have a mollic epipedon. La Hogue soils are somewhat poorly drained, and Wea soils are well drained.

Typical pedon of Ruark fine sandy loam, 365 feet west of the center of old Illinois Route 1 and 70 feet north of center of sec. 22, T. 25 N., R. 12 W.

Ap—0 to 11 inches; very dark grayish brown (10YR 3/2) fine sandy loam, light brownish gray (10YR 6/2) dry; weak very fine granular structure; friable; many fine roots; medium acid; abrupt smooth boundary.

A2—11 to 17 inches; grayish brown (2.5Y 5/2) fine sandy loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak thick platy structure; friable; common fine roots; medium acid; clear smooth boundary.

B1—17 to 21 inches; grayish brown (2.5Y 5/2) fine sandy loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to weak fine subangular blocky; friable; few fine roots; medium acid; clear smooth boundary.

B21t—21 to 28 inches; grayish brown (2.5Y 5/2) fine sandy loam; common fine distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate fine subangular blocky; friable; few fine roots; continuous thin dark grayish brown (2.5Y 4/2) clay films on faces of peds; medium acid; clear smooth boundary.

B22t—28 to 37 inches; grayish brown (2.5Y 5/2) sandy clay loam; common fine distinct yellowish brown (10YR 5/6) mottles; strong medium prismatic structure parting to strong fine and medium subangular blocky; friable; few fine roots; continuous thin grayish brown (2.5Y 5/2) clay films on faces of peds; medium acid; clear smooth boundary.

B23t—37 to 43 inches; grayish brown (2.5Y 5/2) sandy clay loam; many fine distinct yellowish brown (10YR 5/6) mottles; strong medium prismatic structure; friable; few fine roots; continuous thin dark grayish brown (2.5Y 4/2) clay films on faces of peds; medium acid; abrupt smooth boundary.

B3—43 to 50 inches; grayish brown (2.5Y 5/2) fine sandy loam; many fine distinct yellowish brown (10YR 5/8) mottles; weak coarse prismatic structure; friable; slightly acid; clear smooth boundary.

C—50 to 60 inches; mottled yellowish brown (10YR 5/8) and grayish brown (2.5Y 5/2) fine sandy loam; massive; friable; slightly acid.

The solum ranges from 30 to 50 inches in thickness. It is slightly acid to strongly acid.

The A1 or Ap horizon has value of 3 through 6 (6 or 7 dry) and chroma of 1 or 2. It averages less than 0.6 percent in organic carbon content. It is dominantly fine sandy loam, but the range includes loam and very fine sandy loam. The A2 horizon has hue of 10YR or 2.5Y, value of 5 through 7, and chroma of 2 or less. The B2 horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 through 6, and chroma of 2 or less. It is dominantly sandy clay loam or clay loam, but the range includes fine sandy loam. The C horizon is dominantly loamy fine sand, fine sandy loam, or sandy clay loam but in some pedons has thin strata of sand, fine gravel, loam, silt loam, or silty clay loam. It is slightly acid or neutral.

Rutland series

The Rutland series consists of deep, somewhat poorly drained soils on uplands. These soils formed in loess or silty material and in the underlying clayey glacial till or lakebed sediments. They are moderately slowly permeable in the subsoil and slowly permeable in the substratum. Slopes range from 1 to 5 percent.

Rutland soils are similar to Clarence and Martinton soils and commonly are adjacent to Clarence and Rowe soils. They are in positions on the landscape similar to those of Clarence and Martinton soils. Clarence and Rowe soils contain more clay in the solum than the Rutland soils. Also, Rowe soils are poorly drained and are in shallow depressions and drainageways. Martinton soils formed entirely in silt loam or silty clay loam lacustrine sediments.

Typical pedon of Rutland silty clay loam, 1 to 5 percent slopes, 710 feet north and 150 feet east of the southwest corner of sec. 4, T. 25 N., R. 10 E.

Ap—0 to 9 inches; black (10YR 2/1) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate very fine granular structure; friable; many fine roots; medium acid; abrupt smooth boundary.

A12—9 to 13 inches; black (10YR 2/1) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate fine granular structure; firm; slightly acid; clear smooth boundary.

B1t—13 to 20 inches; dark brown (10YR 4/3) silty clay; common fine faint dark grayish brown (10YR 4/2) mottles; moderate very fine and fine subangular blocky structure; firm; many thin dark grayish brown (10YR 4/2) and very dark gray (10YR 3/1) clay films on faces of peds; common fine roots; slightly acid; clear smooth boundary.

B21t—20 to 25 inches; dark brown (10YR 4/3) silty clay; common fine faint dark grayish brown (10YR 4/2) mottles; weak medium prismatic structure parting to moderate fine and medium subangular blocky; firm; many thin dark grayish brown (10YR 4/2) clay films on faces of peds; common fine roots; neutral; clear smooth boundary.

B22t—25 to 30 inches; dark brown (10YR 4/3) silty clay; common fine faint yellowish brown (10YR 5/6) and dark grayish brown (10YR 4/2) mottles; moderate medium prismatic structure parting to weak fine and medium subangular blocky; firm; many thin dark grayish brown (10YR 4/2) clay films on faces of peds; common fine roots; neutral; clear smooth boundary.

B23t—30 to 39 inches; brown (10YR 5/3) silty clay loam; many medium faint yellowish brown (10YR 5/6) and common medium faint dark grayish brown (10YR 4/2) mottles; weak medium prismatic structure; friable; common thin grayish brown (10YR 5/2) clay films on faces of peds; few fine roots; slight effervescence; mildly alkaline; clear smooth boundary.

B31t—39 to 50 inches; brown (10YR 5/3) silt loam; many medium faint yellowish brown (10YR 5/6) and common medium faint dark grayish brown (10YR 4/2) mottles; weak medium prismatic structure; friable; few thin grayish brown (10YR 5/2) clay films on faces of peds; few fine white accumulations of calcium carbonate; strong effervescence; moderately alkaline; clear smooth boundary.

IIB32t—50 to 55 inches; light olive brown (2.5Y 5/4) silty clay; many medium faint grayish brown (2.5Y 5/2) mottles; moderate medium prismatic structure; firm; common thin grayish brown (2.5Y 5/2) clay films on faces of peds; few fine white accumulations of calcium carbonate; strong effervescence; moderately alkaline; clear smooth boundary.

IIC—55 to 60 inches; olive (5Y 4/3) silty clay; many medium distinct grayish brown (2.5Y 5/2) mottles; massive; very firm; many medium white accumulations of calcium carbonate; violent effervescence; moderately alkaline.

The thickness of the solum ranges from 40 to 60 inches. The thickness of the loess ranges from 35 to 55 inches. The thickness of the mollic epipedon ranges from 10 to 20 inches.

The A horizon has value of 2 or 3 and chroma of 1 or 2. It is silty clay loam or silt loam. The B2 horizon has hue of 10YR or 2.5Y, value of 3 through 6, and chroma of 1 through 4. It is slightly acid to mildly alkaline. The IIB3 horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 through 6, and chroma of 1 through 6. It is silty clay or clay. The C horizon also is silty clay or clay.

Sawmill series

The Sawmill series consists of deep, poorly drained, moderately permeable soils on bottom land. These soils formed in silty alluvial sediments. Slopes range from 0 to 2 percent.

Sawmill soils are similar to Comfrey soils and commonly are adjacent to Chatsworth, Comfrey, Del Rey, and Martinsville soils. Chatsworth, Del Rey, and Martinsville soils are better drained than the Sawmill soils, are higher on the landscape, and are not subject to flooding. Also, Chatsworth soils contain more clay in the subsoil. Comfrey soils are in positions on the landscape similar to those of the Sawmill soils. Their subsoil contains more sand than that of the Sawmill soils.

Typical pedon of Sawmill silty clay loam, 1,480 feet north and 1,780 feet east of the southwest corner of sec. 30, T. 26 N., R. 14 W.

Ap—0 to 9 inches; black (N 2/0) silty clay loam, dark gray (10YR 4/1) dry; weak medium subangular blocky structure parting to moderate very fine granular; firm; many fine roots; mildly alkaline; abrupt smooth boundary.

A12—9 to 13 inches; black (N 2/0) silty clay loam, dark gray (10YR 4/1) dry; weak medium subangular blocky structure parting to moderate very fine granular; firm; common fine roots; neutral; clear smooth boundary.

A13—13 to 19 inches; black (N 2/0) silty clay loam, dark gray (10YR 4/1) dry; moderate fine granular structure; firm; common fine roots; neutral; clear smooth boundary.

B1g—19 to 30 inches; very dark gray (5Y 3/1) silty clay loam, dark gray (10YR 4/1) dry; moderate medium prismatic structure parting to moderate fine subangular blocky; firm; common fine roots; neutral; clear smooth boundary.

B21g—30 to 38 inches; olive gray (5Y 4/2) silty clay loam; many fine distinct yellowish brown (10YR 5/4) mottles; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; firm; common fine roots; many thin very dark gray (5Y 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

B22g—38 to 46 inches; olive gray (5Y 5/2) silty clay loam; many fine prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to weak medium subangular blocky; firm; few fine roots; many thin dark gray (5Y 4/1) coatings on faces of peds; neutral; gradual smooth boundary.

B3g—46 to 58 inches; olive gray (5Y 5/2) silty clay loam; many medium prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to weak medium subangular blocky; firm; few fine roots; many thin gray (5Y 5/1) coatings on faces of peds; neutral; gradual wavy boundary.

Cg—58 to 60 inches; olive gray (5Y 5/2) silty clay loam; many medium prominent yellowish brown (10YR 5/6) mottles; massive; firm; neutral.

The thickness of the solum ranges from 36 to more than 60 inches. The mollic epipedon ranges from 24 to 36 inches in thickness. It includes the upper part of the B horizon in some pedons.

The A horizon has hue of 10YR, 2.5Y, 5Y or is neutral in hue. It has value of 2 or 3 and chroma of 2 or less. The B2 horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 through 6, and chroma of 2 or less. It is dominantly silty clay loam but in some pedons has thin strata of silt loam and sandy loam, especially in the lower part. It is slightly acid to mildly alkaline. The C horizon is dominantly silty clay loam but in some pedons has thin strata of loam, silt loam, sandy loam, or silty clay. It is calcareous in some pedons.

Saybrook series

The Saybrook series consists of deep, moderately well drained, moderately permeable soils on uplands. These soils formed in loess or silty material and in the underlying silt loam glacial till. Slopes range from 2 to 5 percent.

These soils have a thinner dark A horizon and a lighter colored B1 horizon than is definitive for the Saybrook series. These differences, however, do not significantly affect the use or behavior of the soils.

Saybrook soils are similar to Lisbon and Symerton soils and commonly are adjacent to those soils and to Milford soils. The somewhat poorly drained Lisbon soils are less sloping than the Saybrook soils. The poorly drained Milford soils are in shallow depressions and drainageways. Their solum contains more clay than that of the Saybrook soils. Symerton soils are in positions on the landscape similar to those of the Saybrook soils. Their solum contains more sand than that of the Saybrook soils.

Typical pedon of Saybrook silt loam, 2 to 5 percent slopes, eroded, 385 feet north and 415 feet east of the southwest corner of sec. 34, T. 24 N., R. 11 W.

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; moderate fine and very fine granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

B1t—7 to 10 inches; yellowish brown (10YR 5/4) silt loam; few fine faint yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure parting to moderate fine granular; friable; many fine roots; many thin very dark grayish brown (10YR 3/2) and common thin dark brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

B21t—10 to 15 inches; yellowish brown (10YR 5/4) silty clay loam; common fine faint yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; firm; common fine roots; many thin dark brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

B22t—15 to 24 inches; yellowish brown (10YR 5/4) silty clay loam; common fine faint yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate medium subangular blocky; firm; common fine roots; many thin dark brown (10YR 4/3) clay films on faces of peds; firm; medium acid; clear wavy boundary.

IIB3t—24 to 32 inches; light yellowish brown (2.5Y 6/4) silt loam; common fine distinct yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure; firm; few fine roots; common thin dark brown (10YR 4/3) clay films on faces of peds; slight effervescence; mildly alkaline; gradual wavy boundary.

IIC—32 to 60 inches; mottled light yellowish brown (2.5Y 6/4), yellowish brown (10YR 5/6), and light gray (10YR 7/2) silt loam; massive; firm; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 24 to 40 inches. It commonly is more than the depth to free carbonates. The thickness of the mollic epipedon ranges from 6 to 14 inches.

The A horizon has value of 2 or 3 and chroma of 1 through 3. The B2 horizon has hue of 10YR, value of 4 or 5, and chroma of 3 through 6 in the upper part and is mottled or has hue of 2.5Y or chroma of 2, or both, in the lower part. It is medium acid to neutral. The C horizon is silt loam or loam.

Selma series

The Selma series consists of deep, poorly drained soils on outwash plains. These soils formed in loamy glacial outwash. They are moderately permeable in the subsoil and moderately rapidly permeable in the substratum. Slopes range from 0 to 2 percent.

Selma soils are similar to La Hogue, Odell, and Pella soils and commonly are adjacent to Gilford, La Hogue, Odell, and Ridgeville soils. The somewhat poorly drained La Hogue, Odell, and Ridgeville soils are higher on the landscape than the Selma soils. Also, the solum of Ridgeville soils contains more sand. Pella soils are in positions on the landscape similar to those of the Selma soils. Their subsoil contains less sand than that of the Selma soils. Gilford soils are very poorly drained. Their solum contains more sand than that of the Selma soils.

Typical pedon of Selma loam, 52 feet south and 160 feet west of the northeast corner of sec. 18, T. 28 N., R. 10 E.

Ap—0 to 9 inches; black (10YR 2/1) loam, very dark gray (10YR 3/1) dry; moderate fine granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

A12—9 to 12 inches; very dark gray (10YR 3/1) loam, dark gray (10YR 4/1) dry; weak fine granular structure; friable; common fine roots; neutral; clear smooth boundary.

B1tg—12 to 17 inches; dark gray (5Y 4/1) loam; moderate fine and very fine subangular blocky structure; friable; common fine roots; very dark gray (10YR 3/1) clay films on faces of peds; neutral; clear smooth boundary.

B21tg—17 to 25 inches; gray (5Y 5/1) loam; many medium distinct yellowish brown (10YR 5/6) and light olive brown (2.5Y 5/4) mottles; weak fine prismatic structure parting to moderate fine and very fine subangular blocky; friable; common fine roots; very dark gray (10YR 3/1) clay films on faces of peds; mildly alkaline; clear smooth boundary.

B22tg—25 to 31 inches; gray (5Y 5/1) loam; many medium prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate fine subangular blocky; friable; common fine roots; dark grayish brown (2.5Y 4/2) clay films on faces of peds; mildly alkaline; clear smooth boundary.

B31tg—31 to 36 inches; mottled gray (5Y 5/1) and yellowish brown (10YR 5/6) loam; weak medium prismatic structure parting to moderate fine subangular blocky; friable; few fine roots; black (10YR 2/1) krotovinas in the lower part; common medium light gray concretions of calcium carbonate; slight effervescence; moderately alkaline; clear smooth boundary.

B32g—36 to 44 inches; gray (5Y 5/1) sandy loam; common medium distinct light olive brown (2.5Y 5/4) and common medium prominent yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; very friable; few fine roots; slight effervescence; moderately alkaline; gradual smooth boundary.

Cg—44 to 60 inches; gray (5Y 5/1) stratified silt loam and loamy sand; common medium prominent yellowish brown (10YR 5/8) mottles; massive in the silt loam and single grained in the loamy sand; friable; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 35 to 55 inches. The thickness of the mollic epipedon ranges from 10 to 20 inches.

The A horizon has value of 2 or 3 and chroma of 1 or 2. It is dominantly loam, but the range includes silt loam, clay loam, and silty clay loam. The B2 horizon has hue of 2.5Y, 5Y, or 10YR or is neutral in hue. It has value of 4 through 6 and chroma of 0 through 2. It is slightly acid to mildly alkaline. It is dominantly loam or clay loam, but

in some pedons the lower part either is silty clay loam or silt loam high in content of sand or is sandy clay loam or sandy loam. The content of clay in the control section ranges from 20 to 30 percent. The C horizon is stratified sand, loamy sand, sandy loam, loam, or silt loam and contains some gravel in some pedons. It is neutral to moderately alkaline and is calcareous in many pedons.

Sparta series

The Sparta series consists of deep, excessively drained, rapidly permeable soils on outwash plains, lake plains, and glacial till plains. These soils formed in wind-deposited sand or water-deposited sand reworked by the wind. Slopes range from 1 to 5 percent.

Sparta soils are similar to Chelsea soils and commonly are adjacent to Corwin, Gilford, Granby, and Watseka soils. Chelsea soils are in positions on the landscape similar to those of the Sparta soils. They do not have a mollic epipedon. The moderately well drained Corwin and somewhat poorly drained Watseka soils are lower on the landscape than the Sparta soils. The very poorly drained Gilford and Granby soils are in shallow depressions and drainageways.

Typical pedon of Sparta fine sand, 1 to 5 percent slopes, 792 feet south and 60 feet west of the northeast corner of sec. 23, T. 26 N., R. 12 W.

Ap—0 to 9 inches; very dark gray (10YR 3/1) fine sand, dark grayish brown (10YR 4/2) dry; weak very fine granular structure; very friable; many fine roots; neutral; abrupt smooth boundary.

A3—9 to 21 inches; very dark grayish brown (10YR 3/2) loamy fine sand, grayish brown (10YR 5/2) dry; weak very fine granular structure; very friable; common fine roots; many thin very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

B21—21 to 30 inches; dark yellowish brown (10YR 4/4) fine sand; few fine faint yellowish brown (10YR 5/6) mottles; single grained; loose; common fine roots; slightly acid; clear smooth boundary.

B22—30 to 44 inches; dark yellowish brown (10YR 4/4) fine sand; common fine faint yellowish brown (10YR 5/8) mottles; single grained; loose; few fine roots; slightly acid; abrupt smooth boundary.

C—44 to 60 inches; yellowish brown (10YR 5/4) fine sand; single grained; loose; few fine roots; brown (7.5YR 5/4) and yellowish brown (10YR 5/4) fine sand iron bands between 53 and 60 inches; medium acid.

The thickness of the solum ranges from 24 to 46 inches. The thickness of the mollic epipedon ranges from 10 to 18 inches.

The Ap or A1 horizon has value of 2 or 3 and chroma of 1 or 2. It is fine sand or loamy fine sand. The A3 horizon also is fine sand or loamy fine sand. It has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 2 or 3. Its content of organic carbon is less than 0.6 percent. The B2 horizon has hue of 10YR or 7.5YR and value and chroma of 3 through 6. It is strongly acid to slightly acid. It is fine sand, loamy fine sand, or loamy sand. In the control section, the content of fine sand or finer particles averages 30 percent or more and the content of coarse sand or very coarse sand 20 percent or less. The C horizon is fine sand or sand. It is strongly acid or medium acid. In some pedons it does not have iron bands below a depth of 40 inches.

St. Clair series

The St. Clair series consists of deep, moderately well drained, very slowly permeable soils on uplands. These soils formed in silty clay or clay glacial till. Slopes range from 12 to 30 percent.

These soils are shallower to gray mottles and have lower chroma in the subsoil than is definitive for the St. Clair series. These differences, however, do not significantly affect the use or behavior of the soils.

St. Clair soils are similar to Clarence and Nappanee soils and commonly are adjacent to those soils. The adjacent soils are on shoulder slopes above the St. Clair soils and are somewhat poorly drained. Also, Clarence soils have a mollic epipedon.

Typical pedon of St. Clair loam, 12 to 30 percent slopes, 114 feet north and 783 feet west of the southeast corner of sec. 7, T. 24 N., R. 10 E.

A11—0 to 5 inches; very dark gray (10YR 3/1) loam, dark grayish brown (10YR 4/2) dry; weak fine granular structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

A12—5 to 6 inches; dark grayish brown (10YR 4/2) loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; many fine roots; slightly acid; clear smooth boundary.

A2—6 to 8 inches; dark brown (10YR 4/3) clay loam; weak coarse platy structure; firm; many fine roots; common thin very dark grayish brown (10YR 3/2) organic coatings on faces of peds; medium acid; abrupt smooth boundary.

B21t—8 to 12 inches; dark brown (10YR 4/3) silty clay; weak medium prismatic structure parting to moderate very fine subangular blocky; firm; common fine roots; many thin dark yellowish brown (10YR 4/4) clay films on faces of peds; medium acid; abrupt smooth boundary.

B22t—12 to 18 inches; dark grayish brown (2.5Y 4/2) silty clay; common fine distinct dark brown (10YR 4/3) mottles; moderate medium prismatic structure parting to weak fine subangular blocky; very firm; few fine roots; many thin olive brown (2.5Y 4/4) clay films on faces of peds; neutral; gradual smooth boundary.

B31t—18 to 21 inches; dark grayish brown (2.5Y 4/2) silty clay; common fine distinct gray (5Y 5/1) and common fine faint light olive brown (2.5Y 5/4) mottles; moderate medium prismatic structure parting to moderate fine subangular blocky; very firm; few fine roots; many thin dark grayish brown (2.5Y 4/2) clay films on faces of peds; slight effervescence; mildly alkaline; gradual wavy boundary.

B32t—21 to 24 inches; dark grayish brown (2.5Y 4/2) silty clay; common fine distinct gray (5Y 5/1) and common fine faint light olive brown (2.5Y 5/4) mottles; weak fine subangular blocky structure; very firm; few fine roots; many thin dark grayish brown (2.5Y 4/2) clay films on faces of peds; slight effervescence; mildly alkaline; gradual wavy boundary.

C1—24 to 35 inches; dark grayish brown (2.5Y 4/2) silty clay; common fine distinct gray (5Y 5/1) and common fine faint light olive brown (2.5Y 5/4) mottles; massive; very firm; many thin gray (5Y 5/1) coatings on pressure faces; strong effervescence; mildly alkaline; gradual wavy boundary.

C2—35 to 60 inches; olive gray (5Y 4/2) silty clay; common fine distinct gray (5Y 5/1) mottles; massive; very firm; many thin gray (5Y 5/1) coatings on pressure faces; strong effervescence; moderately alkaline.

The solum ranges from 20 to 30 inches in thickness. It ranges from medium acid to mildly alkaline. The pH generally increases with increasing depth. The depth to carbonates is commonly less than the thickness of the solum.

The A1 or Ap horizon has value of 3 through 5 and chroma of 1 through 3. It is dominantly loam, but the range includes silt loam, silty clay loam, and clay loam. The A2 horizon has value of 4 through 6 and chroma of 2 or 3. It is dominantly clay loam, but the range includes silt loam, loam, and silty clay loam. The B2 horizon has hue of 2.5Y, 10YR, or 7.5YR, value of 4 or 5, and chroma of 2 through 4. It is silty clay or clay in which the content of clay ranges from 50 to 60 percent. The C horizon has hue of 2.5Y or 5Y, value of 4 or 5, and chroma of 1 through 4. It is silty clay or clay in which the content of clay ranges from 40 to 55 percent.

Swygert series

The Swygert series consists of deep, somewhat poorly drained soils on uplands. These soils generally formed in clayey lacustrine sediments and in the underlying silty clay or clay glacial till. In some areas, however, they formed entirely in the clayey lacustrine sediments. They are slowly permeable in the upper part of the subsoil and very slowly permeable in the lower part and in the substratum. Slopes range from 0 to 5 percent.

Swygert soils are similar to Clarence and Mokena soils and commonly are adjacent to Bryce and Mokena soils. The poorly drained Bryce soils are in shallow depressions and drainageways. Clarence soils are in positions on the landscape similar to those of the Swygert soils. Their B horizon formed entirely in silty clay glacial till. Mokena soils are higher on the landscape than the Swygert soils. Also, they contain less clay in the upper part of the subsoil.

Typical pedon of Swygert silty clay loam, 0 to 2 percent slopes, 339 feet south and 66 feet east of the northwest corner of sec. 7, T. 25 N., R. 13 W.

Ap1—0 to 7 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate very fine granular structure; friable; many fine roots; slightly acid; abrupt wavy boundary.

Ap2—7 to 12 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak medium angular blocky structure parting to weak fine subangular blocky; friable; many fine roots; common black krotovinas; slightly acid; abrupt smooth boundary.

B1t—12 to 18 inches; very dark grayish brown (10YR 3/2) silty clay, gray (10YR 5/1) dry; common fine distinct yellowish brown (10YR 5/4) mottles; moderate fine subangular blocky structure; friable; many fine roots; continuous very dark gray (10YR 3/1) and black (10YR 2/1) clay films and organic coatings on faces of peds; common fine black concretions (iron and manganese oxide); medium acid; clear wavy boundary.

B21t—18 to 26 inches; dark brown (10YR 4/3) silty clay; common fine distinct strong brown (7.5YR 5/6) and common fine prominent olive gray (5Y 5/2) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; friable; common fine roots; continuous very dark grayish brown (10YR 3/2) and dark yellowish brown (10YR 4/4) clay films on faces of peds; neutral; clear smooth boundary.

B22t—26 to 31 inches; yellowish brown (10YR 5/4) silty clay; common fine distinct gray (5Y 5/1) and common medium faint yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to weak medium and fine angular blocky; firm; common fine roots; common dark gray (10YR 4/1) and gray (10YR 5/1) clay films on faces of peds; very dark gray (10YR 3/1) organic coatings in root channels and on krotovinas; slight effervescence (7 percent calcium carbonate equivalent); moderately alkaline; gradual smooth boundary.

IIB23t—31 to 41 inches; light olive brown (2.5Y 5/4) silty clay; common medium distinct gray (5Y 5/1) mottles; moderate medium prismatic structure parting to weak coarse angular blocky; very firm; few fine roots; discontinuous gray (5Y 5/1) clay films and very dark gray (10YR 3/1) organic coatings on faces of peds; slight effervescence (16 percent calcium carbonate equivalent); moderately alkaline; clear smooth boundary.

IIB3t—41 to 51 inches; light olive brown (2.5Y 5/4) silty clay; few fine faint olive (5Y 5/6), common fine distinct gray (5Y 5/1), and few fine prominent strong brown (7.5YR 5/6) mottles; weak coarse prismatic structure; very firm; few fine roots; continuous dark gray (5Y 4/1) clay films on faces of peds; discontinuous very dark gray (5Y 3/1) organic coatings along root channels and cracks; common fine dark concretions (iron and manganese oxide); strong effervescence (18 percent calcium carbonate equivalent); moderately alkaline; gradual smooth boundary.

IIC—51 to 60 inches; brown (10YR 5/3) silty clay; few coarse distinct strong brown (7.5YR 5/6 and 5/8) mottles; weak very coarse prismatic structure; very firm; continuous gray (5Y 6/1) coatings on pressure faces; common fine black accumulations (iron and manganese oxide) along vertical columns; strong effervescence (19 percent calcium carbonate equivalent); moderately alkaline.

The thickness of the solum ranges from 24 to more than 60 inches. The depth to glacial till is more than 30 inches. The depth to free carbonates ranges from 30 to 50 inches. The thickness of the mollic epipedon ranges from 10 to 20 inches.

The A horizon has value of 2 or 3 and chroma of 2 or less. It is dominantly silty clay loam, but the range includes silt loam and silty clay. The B2 horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 through 6. It is neutral to moderately alkaline. It has a moist bulk density of less than 1.7 grams per cubic centimeter. The IIB3 horizon has hue of 2.5Y or 5Y, value of 4 through 6, and chroma of 1 through 6. It is mildly alkaline or moderately alkaline. The content of clay in the control section ranges from 42 to 48 percent. The C horizon is dominantly silty clay but in some pedons is silty clay loam or clay. It is mildly alkaline or moderately alkaline.

Symerton series

The Symerton series consists of deep, moderately well drained soils on uplands. These soils formed in loamy glacial outwash, silty glacial till, or silty lakebed sediments commonly mantled with as much as 24 inches of loess. They are moderately permeable in the subsoil and moderately slowly permeable in the substratum. Slopes range from 1 to 5 percent.

Symerton soils are similar to Andres soils and commonly are adjacent to Andres, Elliott, Lisbon, Martinton, and Reddick soils. The somewhat poorly drained Andres, Elliott, Lisbon, and Martinton soils generally are in the less sloping areas. The poorly drained Reddick soils are in shallow depressions and drainageways.

Typical pedon of Symerton silt loam, 1 to 5 percent slopes, 102 feet north and 1,806 feet west of the southeast corner of sec. 33, T. 24 N., R. 12 W.

Ap—0 to 10 inches; black (10YR 2/1) silt loam, very dark gray (10YR 3/1) dry; weak very fine granular structure; firm; many fine roots; slightly acid; abrupt smooth boundary.

A12—10 to 15 inches; very dark gray (10YR 3/1) silt loam, dark grayish brown (10YR 4/2) dry; moderate very fine granular structure; friable; many fine roots; medium acid; clear smooth boundary.

A3—15 to 19 inches; very dark grayish brown (10YR 3/2) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate very fine granular structure; friable; common fine roots; many thin black (10YR 2/1) organic coatings on faces of peds; medium acid; clear smooth boundary.

IIB21t—19 to 25 inches; dark brown (10YR 4/3) gravelly clay loam; moderate very fine subangular blocky structure; firm; common fine roots; many thin very dark gray (10YR 3/1) clay films on faces of peds; common fine dark accumulations (iron and manganese oxide); about 18 percent pebbles; medium acid; clear smooth boundary.

IIB22t—25 to 31 inches; dark brown (10YR 4/3) gravelly clay loam; moderate fine subangular blocky structure; firm; few fine roots; common thin very dark grayish brown (10YR 3/2) clay films on faces of peds; common fine dark accumulations (iron and manganese oxide); about 18 percent pebbles; neutral; clear smooth boundary.

IIB31t—31 to 35 inches; yellowish brown (10YR 5/4) gravelly loam; few fine prominent yellowish red (5YR 5/8) mottles; weak fine and medium subangular blocky structure; firm; few fine roots; common fine dark accumulations (iron and manganese oxide); about 18 percent pebbles; slight effervescence; mildly alkaline; clear smooth boundary.

IIIB32t—35 to 39 inches; brown (10YR 5/3) silt loam; few fine prominent yellowish red (5YR 5/8) mottles; weak medium prismatic structure parting to weak medium subangular blocky; firm; few thin dark brown (10YR 4/3) clay films on faces of peds; few fine roots; slight effervescence; mildly alkaline; clear smooth boundary.

IIIC—39 to 60 inches; light olive brown (2.5Y 5/4) and light yellowish brown (2.5Y 6/4) silt loam; few fine prominent yellowish red (5YR 4/8) and few fine faint gray (10YR 5/1) mottles; massive; firm; strong effervescence; mildly alkaline.

The thickness of the solum ranges from 30 to 55 inches. The depth to free carbonates ranges from 26 to 50 inches. Commonly, as much as 24 inches of loess overlies the outwash. The thickness of the mollic epipedon ranges from 10 to 22 inches.

The A horizon has value of 2 or 3 and chroma of 1 or 2. It is silt loam, loam, or silty clay loam. The IIB2 horizon has hue of 10YR, value of 4 through 6, and chroma of 3 through 6. It ranges from medium acid to mildly alkaline. The pH commonly increases with increasing depth. This horizon is dominantly gravelly clay loam, but the range includes clay loam, silty clay loam, and sandy clay loam. The content of clay in the control section ranges from 27 to 35 percent. The content of gravel ranges from 0 to 20 percent. The IIIB3 and C horizons are silt loam or silty clay loam.

Tice series

The Tice series consists of deep, somewhat poorly drained, moderately permeable soils on bottom land. These soils formed in silty alluvial sediments. Slopes range from 0 to 2 percent.

Tice soils commonly are adjacent to Allison, Comfrey, and Sawmill soils. The well drained Allison soils are higher on the landscape than the Tice soils, and the poorly drained Comfrey and Sawmill soils are lower on the landscape. Also, Comfrey soils contain more sand in the subsoil.

Typical pedon of Tice silt loam, 635 feet north and 100 feet east of the center of sec. 23, T. 27 N., R. 13 W.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate very fine granular structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

A12—8 to 12 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure parting to moderate very fine granular; friable; many fine roots; many thin very dark grayish brown (10YR 3/2) coatings on faces of peds; neutral; clear smooth boundary.

B1—12 to 18 inches; dark brown (10YR 4/3) silty clay loam; common fine faint dark grayish brown (10YR 4/2) mottles; weak medium subangular blocky structure; firm; common fine roots; many thin very dark grayish brown (10YR 3/2) coatings on faces of peds; neutral; clear smooth boundary.

B21—18 to 23 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; firm; common fine roots; common thin dark grayish brown (10YR 4/2) and very dark grayish brown (10YR 3/2) coatings on faces of peds; neutral; clear smooth boundary.

B22—23 to 37 inches; dark brown (10YR 4/3) silty clay loam; moderate medium prismatic structure parting to weak fine subangular blocky; firm; few fine roots; many thin dark brown (10YR 4/3) and common thin dark grayish brown (10YR 4/2) coatings on faces of peds; neutral; clear smooth boundary.

B31—37 to 49 inches; dark brown (10YR 4/3) silty clay loam; common fine faint dark grayish brown (10YR 4/2) mottles; weak medium prismatic structure; friable; few fine roots; common thin dark grayish brown (10YR 4/2) and dark brown (10YR 3/3) coatings on faces of peds; neutral; clear smooth boundary.

B32—49 to 60 inches; dark brown (10YR 4/3) silty clay loam; weak medium prismatic structure; friable; common thin dark brown (10YR 3/3) coatings on faces of peds; neutral.

The thickness of the solum ranges from 30 to more than 60 inches. The thickness of the mollic epipedon ranges from 10 to 20 inches.

The A horizon has value of 2 or 3 and chroma of 1 or 2. It is dominantly silt loam, but the range includes silty clay loam. The B2 horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 through 4. It is medium acid to neutral. It is dominantly silty clay loam but in some pedons has thin strata of silt loam, loam, clay loam, or sandy loam in the lower part. The content of clay in the control section ranges from 27 to 35 percent. The C horizon is typically silty clay loam but in some pedons is clay loam, loam, sandy loam, or silt loam. It is slightly acid to mildly alkaline.

Varna series

The Varna series consists of deep, moderately well drained, moderately slowly permeable soils on uplands. These soils formed in loess or silty material and in the underlying silty clay loam glacial till. Slopes range from 1 to 5 percent.

Varna soils are similar to Elliott soils and commonly are adjacent to Ashkum and Elliott soils. The poorly drained Ashkum soils are in shallow depressions and drainageways. The somewhat poorly drained Elliott soils are in positions on the landscape similar to those of the Varna soils.

Typical pedon of Varna loam, 1 to 5 percent slopes, 142 feet south and 1,420 feet west of the northeast corner of sec. 19, T. 29 N., R. 11 E.

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; moderate very fine granular structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

B21t—10 to 17 inches; yellowish brown (10YR 5/4) silty clay; weak fine prismatic structure parting to moderate very fine subangular blocky; friable; common fine roots; many thin faint brown (10YR 5/3) and common very dark grayish brown (10YR 3/2) clay films on faces of peds; medium acid; clear smooth boundary.

B22t—17 to 22 inches; dark yellowish brown (10YR 4/4) silty clay; common fine faint yellowish brown (10YR 5/6) and dark grayish brown (10YR 4/2) mottles; moderate fine prismatic structure parting to moderate very fine and fine subangular blocky; firm; common fine roots; many thin dark brown (10YR 3/3) clay films on faces of peds; medium acid; clear smooth boundary.

B23t—22 to 31 inches; dark brown (10YR 4/3) silty clay; common fine faint yellowish brown (10YR 5/6) and dark grayish brown (10YR 4/2) mottles; strong medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; common thin very dark grayish brown (10YR 3/2) and many thin dark brown (10YR 4/3) clay films on faces of peds; common very fine dark accumulations (iron and manganese oxide); neutral; clear smooth boundary.

B31t—31 to 40 inches; brown (10YR 5/3) silty clay loam; common fine faint grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) mottles; strong medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; common thin very dark grayish brown (10YR 3/2) clay films on faces of peds; common very fine dark accumulations (iron and manganese oxide); slight effervescence; mildly alkaline; clear smooth boundary.

B32t—40 to 44 inches; dark brown (10YR 4/3) silty clay loam; few medium distinct strong brown (7.5YR 5/6), common fine faint grayish brown (10YR 5/2), and few fine faint yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to weak medium subangular blocky; firm; common thin very dark grayish brown (10YR 3/2) clay films on faces of peds; slight effervescence; mildly alkaline; clear smooth boundary.

C—44 to 60 inches; dark brown (10YR 4/3) silty clay loam; few medium distinct strong brown (7.5Y 5/6), common fine faint grayish brown (10YR 5/2), and few fine faint yellowish brown (10YR 5/6) mottles; massive; firm; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 24 to 60 inches. It commonly is more than the depth to free carbonates. The thickness of the mollic epipedon ranges from 10 to 16 inches.

The A horizon has value of 2 or 3 and chroma of 1 or 2. It is loam or silt loam. The B2 horizon has hue of 10YR or 2.5Y and value of 4 through 6. It has chroma of 3 or 4 in the upper part and 1 through 4 in the lower part. It is silty clay, clay, or silty clay loam. It is medium acid to neutral. The C horizon is dominantly silty clay loam, but the range includes clay loam.

Watseka series

The Watseka series consists of deep, somewhat poorly drained, rapidly permeable soils on outwash plains. These soils formed in wind- or water-deposited sandy material. Slopes range from 0 to 2 percent.

Watseka soils are similar to Morocco and Wesley soils and commonly are adjacent to those soils and to Gilford, Granby, and Sparta soils. The very poorly drained Gilford and Granby soils are in shallow depressions and drainageways. Also, Gilford soils contain more clay in the subsoil than the Watseka soils. Morocco soils are in positions on the landscape similar to those of the Watseka soils. They lack a mollic epipedon. The excessively drained Sparta soils are higher on the landscape than the Watseka soils. Wesley soils contain more clay in the subsoil than the Watseka soils and have a substratum of silty clay loam glacial till. Their positions on the landscape are similar to those of the Watseka soils.

Typical pedon of Watseka loamy sand, 220 feet south and 175 feet east of the northwest corner of sec. 23, T. 29 N., R. 11 W.

Ap—0 to 8 inches; black (10YR 2/1) loamy sand, dark gray (10YR 4/1) dry; weak very fine granular structure; very friable; many fine roots; slightly acid; clear smooth boundary.

A12—8 to 14 inches; very dark gray (10YR 3/1) loamy fine sand, gray (10YR 5/1) dry; common medium faint very dark grayish brown (10YR 3/2) mottles; weak very fine granular structure; very friable; many fine roots; slightly acid; clear smooth boundary.

B1—14 to 18 inches; dark yellowish brown (10YR 4/4) fine sand; common medium faint very dark grayish brown (10YR 3/2) mottles; weak very fine granular structure; very friable; common fine roots; many thin dark grayish brown (10YR 4/2) coatings on sand grains; medium acid; gradual smooth boundary.

B2—18 to 37 inches; yellowish brown (10YR 5/4) fine sand; common fine distinct strong brown (7.5YR 5/6) and common medium faint grayish brown (10YR 5/2) mottles; single grained; loose; few fine roots; medium acid; gradual smooth boundary.

C—37 to 60 inches; mottled grayish brown (10YR 5/2), brown (10YR 5/3), and yellowish brown (10YR 5/4) fine sand; single grained; loose; slightly acid.

The thickness of the solum ranges from 24 to 40 inches. The thickness of the mollic epipedon ranges from 10 to 20 inches.

The A horizon has value of 2 or 3 and chroma of 1 through 3. It is dominantly loamy sand, but the range includes loamy fine sand, fine sand, and sand. The B2 horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 through 7, and chroma of 2 through 6. It is slightly acid to strongly acid. It is fine sand, loamy fine sand, or sand. In some pedons the content of gravel in this horizon is as much as 10 percent. The C horizon is medium acid to neutral. It is fine sand, loamy fine sand, or sand. In some pedons the content of gravel in this horizon is as much as 10 percent.

Wea series

The Wea series consists of deep, well drained soils on outwash plains. These soils formed in loamy glacial outwash over sand and gravel. They are moderately permeable in the subsoil and very rapidly permeable in the substratum. Slopes range from 0 to 2 percent.

Wea soils are similar to Jasper soils and commonly are adjacent to the La Hogue, Milford, Ruark, and Selma soils. Jasper soils are in positions on the landscape similar to those of the Wea soils. The lower part of their solum contains less sand and gravel than that of the Wea soils. The somewhat poorly drained La Hogue soils are lower on the landscape than the Wea soils. The poorly drained Milford, Ruark, and Selma soils are in shallow depressions and drainageways. Milford soils contain more clay in the solum than the Wea soils, and Ruark soils lack a mollic epipedon.

Typical pedon of Wea silt loam, 866 feet north and 35 feet west of the southeast corner of sec. 11, T. 25 N., R. 11 W.

Ap—0 to 10 inches; black (10YR 2/1) silt loam, dark grayish brown (10YR 4/2) dry; moderate very fine granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

A12—10 to 14 inches; very dark grayish brown (10YR 3/2) silt loam, dark grayish brown (10YR 4/2) dry; moderate fine granular structure; friable; many fine roots; slightly acid; clear smooth boundary.

B1t—14 to 18 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium prismatic structure parting to moderate very fine and fine subangular blocky; friable; common fine roots; many thin very dark grayish brown (10YR 3/2) clay films on faces of peds; slightly acid; clear smooth boundary.

IIB21t—18 to 26 inches; dark yellowish brown (10YR 4/4) clay loam; moderate medium prismatic structure parting to moderate fine subangular blocky; friable; common fine roots; many thin dark brown (10YR 3/3) clay films on faces of peds; slightly acid; clear smooth boundary.

IIB22t—26 to 41 inches; brown (7.5YR 4/4) gravelly loam; weak medium prismatic structure parting to moderate fine subangular blocky; firm; few fine roots; many thin dark brown (7.5YR 3/2) clay films on faces of peds; slightly acid; clear wavy boundary.

IIIC—41 to 60 inches; mottled brown (7.5YR 4/4) and light yellowish brown (10YR 6/4) stratified sand and gravel; single grained; loose; strong effervescence; mildly alkaline.

The thickness of the solum ranges from 40 to more than 60 inches. It typically is the same as the depth to sand and gravel. The thickness of the mollic epipedon ranges from 10 to 19 inches.

The A horizon has value of 2 or 3 and chroma of 1 through 3. It is dominantly silt loam, but the range includes loam. The B2 horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 through 6. It is clay loam or loam in the upper part and gravelly loam or gravelly clay loam in the lower part. It generally ranges from strongly acid to neutral but in some pedons is mildly alkaline in the lower part.

Wesley series

The Wesley series consists of deep, somewhat poorly drained soils on outwash plains. These soils formed in wind- or water-deposited loamy and sandy material and in the underlying silty clay loam glacial till or lacustrine sediments. They are moderately rapidly permeable in the upper part of the subsoil and moderately slowly permeable in the lower part and in the substratum. Slopes range from 0 to 3 percent.

These soils contain more clay in the lower part than is definitive for the Wesley series. This difference, however, does not significantly affect the use or behavior of the soils.

Wesley soils are similar to Watseka soils and commonly are adjacent to Gilford, Granby, Selma, and Sparta soils. The very poorly drained Gilford and Granby and poorly drained Selma soils are in shallow depressions and drainageways. Also, Selma soils contain more clay in the subsoil than the Wesley soils. The excessively drained Sparta soils are higher on the landscape than the Wesley soils. Also, their subsoil contains less clay. Watseka soils are in positions on the landscape similar to those of the Wesley soils. They formed entirely in wind- or water-deposited sandy material.

Typical pedon of Wesley fine sandy loam, 0 to 3 percent slopes, 1,480 feet north and 525 feet west of the southeast corner of sec. 13, T. 29 N., R. 12 W.

Ap—0 to 8 inches; black (10YR 2/1) fine sandy loam, very dark gray (10YR 3/1) dry; weak fine granular structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

A12—8 to 11 inches; black (10YR 2/1) fine sandy loam, very dark gray (10YR 3/1) dry; weak medium subangular blocky structure; friable; many fine roots; slightly acid; clear smooth boundary.

B1—11 to 15 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine and medium subangular blocky structure; friable; common fine roots; many thin very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; clear smooth boundary.

B21—15 to 21 inches; dark grayish brown (10YR 4/2) fine sandy loam; common fine faint dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; friable; common fine roots; neutral; clear smooth boundary.

B22—21 to 25 inches; dark grayish brown (10YR 4/2) fine sandy loam; common fine faint dark yellowish brown (10YR 4/4) mottles; single grained; loose; few fine roots; neutral; gradual smooth boundary.

B23—25 to 31 inches; dark grayish brown (10YR 4/2) loamy fine sand; many fine faint dark yellowish brown (10YR 4/4) mottles; single grained; loose; few fine roots; neutral; clear smooth boundary.

B31—31 to 35 inches; yellowish brown (10YR 5/4) fine sand; many medium faint light brownish gray (10YR 6/2) mottles; single grained; loose; few fine roots; slight effervescence; neutral; abrupt smooth boundary.

IIB32—35 to 41 inches; dark gray (5Y 4/1) silty clay loam; many medium distinct dark grayish brown (2.5Y 4/2) mottles; weak medium prismatic structure; firm; strong effervescence; mildly alkaline; gradual wavy boundary.

IIC—41 to 60 inches; dark gray (5Y 4/1) silty clay loam; many medium distinct dark grayish brown (2.5Y 4/2) mottles; massive; firm; strong effervescence; mildly alkaline.

The thickness of the solum ranges from 33 to 53 inches. It commonly is more than the depth to free carbonates. The thickness of the mollic epipedon ranges from 10 to 20 inches.

The A horizon has value of 2 or 3 and chroma of 1 or 2. It is dominantly fine sandy loam, but the range includes loamy fine sand, sandy loam, and loam. The B2 horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 through 6. It is dominantly fine sandy loam, loamy fine sand, or fine sand but in some pedons has thin strata of sandy clay loam or clay loam. It is medium acid to neutral. The IIB3 horizon has hue of 5Y or 2.5Y, value of 4 through 6, and chroma of 4 or less. It is neutral to moderately alkaline.

Zook series

The Zook series consists of deep, poorly drained, slowly permeable soils on bottom land. These soils formed in clayey alluvial sediments. Slopes range from 0 to 2 percent.

Zook soils commonly are adjacent to Chatsworth, Nappanee, and Sawmill soils. The moderately well drained Chatsworth and somewhat poorly drained Nappanee soils are on side slopes above the Zook soils. They lack a mollic epipedon. Sawmill soils contain less clay in the solum than the Zook soils. Their positions on the landscape are similar to those of the Zook soils.

Typical pedon of Zook silty clay, 1,622 feet south and 96 feet east of the northwest corner of sec. 5, T. 25 N., R. 10 E.

Ap—0 to 7 inches; black (10YR 2/1) silty clay, very dark gray (10YR 3/1) dry; moderate fine and medium granular structure; firm; many fine roots; neutral; abrupt smooth boundary.

A12—7 to 12 inches; black (10YR 2/1) silty clay, very dark gray (10YR 3/1) dry; moderate medium granular structure; firm; many fine roots; neutral; clear smooth boundary.

A13—12 to 18 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; moderate fine and medium subangular blocky structure; firm; many fine roots; neutral; gradual smooth boundary.

B1g—18 to 27 inches; black (5Y 2/1) silty clay, very dark gray (10YR 3/1) dry; few fine distinct olive gray (5Y 4/2) mottles; moderate medium subangular blocky structure; firm; common fine roots; many thin black (10YR 2/1) organic coatings on faces of peds; mildly alkaline; clear smooth boundary.

B21g—27 to 33 inches; black (5Y 2/1) silty clay, very dark gray (10YR 3/1) dry; common fine distinct yellowish brown (10YR 5/4) mottles; moderate fine and medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; many thin very dark gray (10YR 3/1) organic coatings on faces of peds; mildly alkaline; clear smooth boundary.

B22g—33 to 39 inches; black (5Y 2/1) silty clay, very dark gray (10YR 3/1) dry; common fine faint olive gray (5Y 4/2) mottles; moderate medium prismatic structure; firm; many thin very dark gray (10YR 3/1) organic coatings on faces of peds; mildly alkaline; gradual smooth boundary.

B23g—39 to 48 inches; very dark gray (5Y 3/1) silty clay, very dark gray (10YR 3/1) dry; common fine distinct yellowish brown (10YR 5/4) mottles; moderate fine prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; common thin very dark gray (10YR 3/1) organic coatings on faces of peds; mildly alkaline; gradual smooth boundary.

B24g—48 to 53 inches; dark gray (5Y 4/1) silty clay; common medium distinct yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure; firm;

many thin dark gray (5Y 4/1) coatings on faces of peds; mildly alkaline; gradual smooth boundary.

Cg—53 to 60 inches; mottled dark gray (5Y 4/1), olive gray (5Y 4/2), yellowish brown (10YR 5/6), and strong brown (7.5YR 5/6) silty clay loam; massive; firm; mildly alkaline.

The solum ranges from 36 to more than 60 inches in thickness. It is slightly acid to mildly alkaline. The depth to free carbonates is more than 50 inches. The mollic epipedon ranges from 36 to 50 inches in thickness. It typically includes the upper part of the B horizon.

The A horizon has hue of 10YR or is neutral in hue. It has value of 2 and chroma of 1 or less in the upper part and value of 2 or 3 and chroma of 1 or less in the lower part. It is dominantly silty clay, but the range includes silty clay loam and clay. The B2 horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 2 or 3 in the upper part and 4 or 5 in the lower part and has chroma of 1 or less. The content of clay in the control section ranges from 36 to 45 percent.

formation of the soils

Soil-forming processes act on deposited or accumulated geologic material. The characteristics of the soil at any given point are determined by (1) the physical and mineralogical composition of the parent material; (2) the plant and animal life on and in the soil; (3) the topography; (4) the climate under which the soil material has accumulated and existed since accumulation; and (5) the length of time that the processes of soil formation have acted on the soil material. These factors of soil formation are so closely interrelated in their effects on the soil that few generalizations can be made regarding the effects of any one factor unless conditions are specified for the other four.

Climate and plant and animal life, chiefly plants, are active factors of soil formation. They act on the parent material that has accumulated through the weathering of rocks, slowly changing it to a natural body that has genetically related horizons. The effects of climate and plant and animal life are conditioned by relief. The parent material affects the kind of soil profile that forms and, in extreme cases, determines it almost entirely. Finally, time is needed for changing the parent material into a soil. Some time is always needed for the differentiation of soil horizons. Usually, a long time is needed for the development of distinct horizons.

parent material

Parent material is the unconsolidated geologic material in which a soil forms. It determines the chemical and mineralogical composition of the soil. In Iroquois County it was deposited by wind, water, glaciers, or melt water from the glaciers. In some areas it was reworked and redeposited by subsequent actions of water and wind. Although all of the parent material in the county is of common glacial origin, its properties vary greatly, sometimes within small areas, depending on how the material was deposited. The soils in the county formed dominantly in glacial till, outwash deposits, lacustrine deposits, loess, alluvium, and organic material.

Glacial till is material laid down directly by glaciers with a minimum of water action. It consists of mixed particles of different sizes. In this county it is calcareous, firm or very firm loam, silt loam, silty clay loam, silty clay, and clay. The small pebbles in this material have sharp corners, indicating that they have not been worn by water.

The glacial till was deposited during several glacial periods of the Wisconsin Age about 22,000 to 12,500 years ago (*13*). The morainic system forms a belt across the county. Glaciers invaded Illinois from the north as the Michigan Lobe and from the east as the Erie Lobe (*7*). Glacial drift of the Erie Lobe includes the Iroquois drift in the northeastern part of the county. Glacial drift in the Michigan Lobe includes the Ellis and Chatsworth drift of the southern part of the county, the Gilman drift in the central part, the St. Anne drift in the northeast corner, and the Collum, Marseilles, and Ransom drift in the northwestern part.

The somewhat poorly drained Odell and moderately well drained Corwin soils formed in loam Iroquois drift. The poorly drained Ashkum, somewhat poorly drained Elliott, and moderately well drained Varna soils formed in the silty clay loam glacial drift on the north-central part of the Gilman moraine and on the Ransom, Marseilles, and St. Anne moraines. The poorly drained Rowe and somewhat poorly drained Clarence soils formed in the silty clay and clay glacial drift on the southwestern part of the Chatsworth moraine and on the Ellis moraine. The somewhat poorly drained Lisbon and moderately well drained Saybrook soils formed in the silt loam glacial drift on the Cullom moraine and on the southeastern part of the Chatsworth moraine. The poorly drained Bryce and somewhat poorly drained Swygert soils formed in lacustrine sediments and in the underlying silty clay glacial drift on the south-central part of the Gilman moraine.

Outwash material was deposited by running water from melting glaciers. The size of the particles varies, depending on the speed of the stream that carried the material. Individual layers generally are made up of particles of similar size, such as sandy loam, sand, gravel, and other coarse particles. When the water slowed down, the coarser particles were deposited. The finer particles, such as very fine sand, silt, and clay, were carried by the more slowly moving water. The well drained Wea and somewhat poorly drained La Hogue soils formed in outwash deposits.

Lacustrine material was deposited from still or ponded glacial melt water. It is silty or clayey. After the coarser fragments were deposited as outwash by moving water, the finer particles, such as very fine sand, silt, and clay, settled in the still water. As a result, the soils formed in lacustrine deposits typically are fine textured.

The ancient bed of former glacial Lake Watseka is extensive in the survey area. It formed during glacial times when water from the Lake Michigan Lobe, the Saginaw Lobe, and the north side of the Erie Lobe was discharged into the Kankakee Valley (*13*). The drainage outlets could not handle the flow. As a result, the water spilled over the upland and formed Lake Watseka. During periods when it was highest, water in the lake cut through gaps in the moraines to the west and flowed to the headwaters of the Vermilion River. New drainage channels formed, and older outlets were abandoned.

Two distinctly different kinds of parent material were deposited on the ancient lakebed and the associated shorelines of Lake Watseka. These are coarse textured beach and near-shore deposits and fine textured slack water and offshore sediments. Along the old shorelines abrupt gradational changes are evident between the fine and coarse textured sediments. The lakebed sediments generally range from 2 to 10 feet in thickness, but the maximum thickness is more than 150 feet. The poorly drained Milford and somewhat poorly drained Martinton soils formed in lacustrine sediments. The somewhat poorly drained Morocco and Watseka soils, the well drained Oakville soils, and the excessively drained Sparta soils formed in coarse textured beach and near-shore deposits.

Loess, or wind-deposited material, is most extensive in the southern part of the county. In the rest of the county, it is discontinuous or does not occur. The somewhat poorly drained Lisbon and moderately well drained Saybrook soils formed in 20 to 40 inches of loess and in the underlying silt loam glacial drift.

Sand dunes formed when the wind removed sandy material from the lakebeds that dried up after the glaciers of Wisconsin Age receded. They are most extensive in the northeastern part of the county. Most are along the shorelines of glacial Lake Watseka. Some are in the uplands east of the former lake. The

Figure 22.—A plant community of native prairie grasses on Clarence soils.

excessively drained Sparta and well drained Oakville soils are in areas where sand dunes are common.

Alluvial material is recently deposited by floodwater from streams. It varies in texture, depending on the speed of the floodwater. The alluvium along a swift stream, such as the part of Sugar Creek east of Milford, is coarser textured than that along a slow, sluggish stream, such as Pigeon Creek. Examples of soils that formed in alluvial material are the poorly drained Comfrey and Sawmill soils.

Organic material is made up of plant remains. After the glaciers withdrew from the area, water was left standing in depressions in outwash, lake, and till plains. As the grasses and sedges growing around the edges of these lakes died, their remains fell to the bottom. Later, water-tolerant plants grew in the areas. As these plants died, their remains became part of the organic accumulation. When the lakes eventually were filled with organic material, areas of muck and peat formed. In some of these areas the plant remains subsequently decomposed. In other areas the material has changed little since deposition. The very poorly drained Houghton and Aurelius soils formed in organic material.

Silurian and Devonian limestone underlies the unconsolidated deposits in the county (*6*). The underlying deposits range from less than 50 to more than 400 feet in thickness. They are thickest in the Mahomet bedrock valley, which is in the southern part of the county. None of the soils in the county formed in material weathered from this bedrock.

plant and animal life

Plants are the principal living organisms affecting the soils in Iroquois County. Micro-organisms, earthworms, insects, and large burrowing animals that live in or on the soil and human activities, however, also have affected soil formation.

The chief contribution of plant and animal life is the addition of organic matter and nitrogen to the soil. The kind of organic material on and in the soil depends on the kind of plants. The remains of these plants accumulate in the surface layer, decay, and eventually become organic matter. The roots of the plants provide channels for the downward movement of water through the soil and add organic matter as they decay. Burrowing animals, such as earthworms, cicadas, and ground squirrels, help to incorporate the organic matter into the soil. Bacteria help to break down the organic matter so that it can be used by growing plants.

The native vegetation in Iroquois County was mainly prairie grass. Some areas were wooded, and scattered areas were marshes. Natural soil drainage and the parent material affected the composition of the plant community.

The soils that formed under the grasses have a thick, black or dark brown surface layer. Various grasses and wild flowers were dominant throughout the broad prairies (fig. 22). Examples of the grasses are big bluestem, indiangrass, and prairie dropseed. In the drier areas, such as those where Sparta soils formed, little bluestem and porcupinegrass were dominant. In the wetter areas, such as those where Ashkum, Bryce, and Milford soils formed, switchgrass and prairie cordgrass were common.

Bluejoint reedgrass and various reeds and sedges grew in the marshes. Various species of oak, hickory, maple, elm, and ash were dominant in the wooded areas (fig. 23). Hackberry and walnut trees also grew in these areas. The surface layer of the soils that formed under trees is lighter colored than that of the soils that formed under grasses because the organic matter is mainly decomposed leaves. Del Rey, Morocco, and Nappanee are examples of soils that formed under trees.

In some small areas human activities have significantly affected soil formation. Strip mining for limestone, borrowing soil material for construction sites, and cutting and filling for roadways, for example, have altered some soils, such as the clayey and loamy Orthents.

topography

Variations in the slope of the land surface greatly affect the runoff rate, the infiltration rate, the extent of erosion, and the natural drainage of the soil.

A comparison between soils that formed in similar kinds of parent material but under different drainage conditions indicates the effect of slope on soil formation. Ashkum and Varna soils formed in loess or silty material and in the underlying silty clay loam glacial till. Ashkum soils are nearly level and poorly drained and have a grayish subsoil. Varna soils are gently sloping and moderately well drained and have a brownish subsoil. The differences in the color of the subsoil are affected by the degree of oxidation of certain mineral compounds, chiefly iron. Nearly level or depressional soils, such as Ashkum soils, have a water table close to the surface nearly all year. The water in the soil pores restricts the circulation of air. Under these conditions, the iron is poorly oxidized and is gray. The water table is lower in the more sloping Varna soils, and some of the rainfall runs off the surface. As a result, these soils are drier and more air is in the pores. Under these conditions, the iron in the subsoil is better oxidized and is brown.

Topography also determines the intensity of erosion. The steeper soils generally are more severely eroded than the less sloping soils. On some soils, such as Chatsworth soils, erosion is so rapid that the surface soil particles are removed as soon as the soil forms. These soils have weakly expressed horizons and generally are shallow to the underlying parent material.

climate

Iroquois County has a temperate, humid, continental climate. Because it is essentially uniform throughout the

Figure 23.—An area of native timber on Morocco soils.

county, climate has not caused any obvious differences among the soils within the survey area. It has differentiated those soils, however, from the soils in other broad regions.

Climate affects soil formation through its effect on weathering, plant and animal life, and erosion. When water from rains and melting snow seeps slowly downward through the soils, it causes physical and chemical changes. In many of the soils in the county, the percolating water has moved clay from the surface layer to the subsoil and has dissolved minerals and moved them downward through the profile. Free carbonates have been leached from the upper layers of many of the soils. As a result, these layers are slightly acid or medium acid.

Climate also affects soil formation by stimulating the growth of living organisms, particularly plants. The climate of the survey area has favored the growth of prairie grasses and hardwood trees.

time

Time greatly affects the degree of profile development in a soil. The influence of time, however, can be modified by erosion, the deposition of material, the topography, and the kind of parent material.

On some of the steeper slopes, erosion removes the surface soil material as soon as the soil forms. The soils on these slopes are immature even though the slopes have been exposed to weathering for thousands of years. Examples are Chatsworth soils.

The soils on flood plains receive alluvial material during each flood. This repeated deposition slows soil formation. Sawmill soils are an example.

The kind of parent material can cause differences between soils that have been exposed to weathering for the same amount of time. For example, Clarence soils, which formed in fine textured material, have less distinct horizons and are more shallow to carbonates than Lisbon soils, which formed in medium textured till. The differences are caused by a slower rate of water percolation through the fine textured Clarence soils.

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glossary

ABC soil. A soil having an A, a B, and a C horizon.

Ablation till. Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

AC soil. A soil having only an A and a C horizon. Commonly such soil formed in recent alluvium or on steep rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher), or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation exchange capacity.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compact layers to depths below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15.2 to 38.1 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Coprogenous earth (sedimentary peat). Fecal material deposited in water by aquatic organisms. The Lco horizon is a limnic layer that contains many fecal pellets.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the removal of water from the soil. Drainage classes are determined on the basis of an overall evaluation of water removal as influenced by climate, slope, and position on the landscape. Precipitation, runoff, amount of moisture infiltrating the soil, and rate of water movement through the soil affect the degree and duration of wetness. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. The soils in this class generally are free of mottles throughout. They commonly are shallow, very porous, or steep, or a combination of these.

Somewhat excessively drained.—Water is removed from the soil rapidly. The soils in this class generally are free of mottles throughout. They commonly are shallow or moderately deep, very porous, or steep, or a combination of these.

Well drained.—Water is removed from the soil so readily that the upper 40 inches generally does not have the mottles or dull colors related to wetness.

Moderately well drained.—Water is removed from the soil so slowly that the upper 20 to 40 inches has the mottles or dull colors related to wetness. The soils in this class commonly have a slowly permeable layer, have a water table, or receive runoff or seepage, or they are characterized by a combination of these.

Somewhat poorly drained.—Water is removed from the soil so slowly that the upper 10 to 20 inches has the mottles or dull colors related to wetness. The soils in this class commonly have a slowly permeable layer, have a water table, or receive runoff or seepage, or they are characterized by a combination of these.

Poorly drained.—Water is removed so slowly that either the soil is periodically saturated or the upper 10 inches has the mottles or dull colors related to wetness. The soils in this class commonly have a slowly permeable layer, have a water table, or receive runoff or seepage, or they are characterized by a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water is at or on the surface most of the time. The soils in this class commonly have a slowly permeable layer, have a water table, or receive runoff or seepage, or they are characterized by a combination of these.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, and clay.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial melt water.

Glacial till (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial melt water. Many deposits are interbedded or laminated.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake in inches per hour is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Sandy loam and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Moraine (geology). An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Muck. Dark colored, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash, glacial. Stratified sand and gravel produced by glaciers and carried, sorted, and deposited by glacial melt water.

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it is generally low in relief.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.20 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Ponding. Standing water on soils in closed depressions. The water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor filter (in tables). Because of rapid permeability or an impermeable layer near the surface, the soil may not adequately filter effluent from a waste disposal system.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH

7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the substratum. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and runoff water.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to insure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has

properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 mm in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the profile below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A1, A2, or A3) below the surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A horizon. Includes all subdivisions of this horizon (A1, A2, and A3).

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Till plain. An extensive flat to undulating area underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, are in soils in extremely small amounts. They are essential to plant growth.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve. A sedimentary layer or a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by melt water streams, in a glacial lake or other body of still water in front of a glacier.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permeanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Data were recorded in the period 1951-77 at Watseka, Illinois]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	31.9	15.8	23.9	59	-14	0	1.87	.78	2.75	5	5.6
February---	37.3	20.5	28.9	63	-11	0	1.78	.76	2.60	5	5.0
March------	48.0	29.3	38.6	76	6	23	3.14	1.76	4.26	8	4.0
April------	62.7	40.4	51.6	85	22	112	4.51	2.70	6.13	9	.8
May--------	73.5	50.0	61.7	91	30	376	4.22	2.40	5.70	8	.0
June-------	82.8	59.3	71.1	97	41	633	4.50	1.79	6.68	7	.0
July-------	85.4	62.7	74.1	98	46	747	4.78	2.39	6.73	7	.0
August-----	83.2	60.4	71.8	94	44	676	3.20	1.48	4.59	6	.0
September--	77.4	53.4	65.4	93	33	462	3.29	1.04	5.08	6	.0
October----	66.1	42.6	54.4	86	24	201	2.65	.91	4.04	5	.0
November---	49.5	31.7	40.6	75	8	18	2.63	1.39	3.65	6	2.6
December---	36.6	21.5	29.1	64	-9	9	2.62	.83	4.03	6	5.2
Yearly:											
Average--	61.2	40.6	50.9	---	---	---	---	---	---	---	---
Extreme--	---	---	---	98	-14	---	---	---	---	---	---
Total----	---	---	---	---	---	3,257	39.19	32.51	45.60	78	23.2

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Data were recorded in the period 1951-77 at Watseka, Illinois]

Probability	Temperature: 24° F or lower	Temperature: 28° F or lower	Temperature: 32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	April 10	May 2	May 15
2 years in 10 later than--	April 6	April 26	May 9
5 years in 10 later than--	March 29	April 16	April 27
First freezing temperature in fall:			
1 year in 10 earlier than--	October 19	October 10	September 29
2 years in 10 earlier than--	October 24	October 15	October 3
5 years in 10 earlier than--	November 2	October 26	October 12

TABLE 3.--GROWING SEASON

[Data were recorded in the period 1951-77 at Watseka, Illinois]

Probability	Daily minimum temperature: Higher than 24° F	Daily minimum temperature: Higher than 28° F	Daily minimum temperature: Higher than 32° F
	Days	Days	Days
9 years in 10	198	166	145
8 years in 10	205	175	152
5 years in 10	217	192	166
2 years in 10	230	209	181
1 year in 10	237	218	188

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
27B	Miami silt loam, 1 to 5 percent slopes	1,260	0.2
49	Watseka loamy sand	7,850	1.1
59	Lisbon silt loam	28,240	3.9
69	Milford silty clay loam	116,540	16.0
88B	Sparta fine sand, 1 to 5 percent slopes	11,806	1.6
91A	Swygert silty clay loam, 0 to 2 percent slopes	19,290	2.7
91B	Swygert silty clay loam, 2 to 5 percent slopes	5,332	0.7
102	La Hogue loam	21,603	3.0
103	Houghton muck	650	0.1
107	Sawmill silty clay loam	8,493	1.2
125	Selma loam	59,372	8.3
131B	Alvin fine sandy loam, 1 to 5 percent slopes	2,850	0.4
141A	Wesley fine sandy loam, 0 to 3 percent slopes	1,450	0.2
145B2	Saybrook silt loam, 2 to 5 percent slopes, eroded	3,633	0.5
146A	Elliott loam, 0 to 2 percent slopes	6,892	1.0
146B	Elliott loam, 2 to 5 percent slopes	2,596	0.4
146B2	Elliott silty clay loam, 2 to 5 percent slopes, eroded	1,988	0.3
147A	Clarence silty clay loam, 0 to 3 percent slopes	13,580	1.9
147B2	Clarence silty clay loam, 2 to 6 percent slopes, eroded	3,773	0.5
150B	Onarga fine sandy loam, 1 to 5 percent slopes	5,960	0.8
151	Ridgeville fine sandy loam	22,974	3.2
153	Pella clay loam	39,590	5.5
178	Ruark fine sandy loam	1,220	0.2
184	Roby loamy fine sand	8,830	1.2
189A	Martinton silty clay loam, 0 to 2 percent slopes	26,692	3.7
189B	Martinton silt loam, 2 to 5 percent slopes	3,670	0.5
189B2	Martinton silty clay loam, 2 to 5 percent slopes, eroded	1,420	0.2
192A	Del Rey silt loam, 0 to 2 percent slopes	8,625	1.2
192B2	Del Rey silty clay loam, 2 to 7 percent slopes, eroded	2,214	0.3
201	Gilford very fine sandy loam	17,710	2.5
223B	Varna loam, 1 to 5 percent slopes	2,136	0.3
228B	Nappanee silt loam, 1 to 6 percent slopes	1,990	0.3
229	Monee silty clay loam	2,070	0.3
230	Rowe silty clay loam	15,880	2.2
232	Ashkum silty clay loam	11,510	1.6
235	Bryce silty clay	92,538	12.9
238	Rantoul silty clay	9,550	1.3
241C	Chatsworth silty clay, 4 to 10 percent slopes	3,275	0.5
241D	Chatsworth silty clay, 10 to 20 percent slopes	680	0.1
284	Tice silt loam	1,450	0.2
293	Andres loam	9,310	1.3
294B	Symerton silt loam, 1 to 5 percent slopes	1,820	0.3
295A	Mokena loam, 0 to 3 percent slopes	8,270	1.2
306A	Allison silty clay loam, 0 to 3 percent slopes	980	0.1
319	Aurelius muck	1,280	0.2
330	Peotone silty clay loam	1,822	0.3
375B	Rutland silty clay loam, 1 to 5 percent slopes	8,115	1.1
398	Wea silt loam	3,850	0.5
405	Zook silty clay	4,990	0.7
440B	Jasper silt loam, 1 to 5 percent slopes	4,866	0.7
443B	Barrington silt loam, 1 to 3 percent slopes	660	0.1
484	Harco silt loam	3,850	0.5
490	Odell silt loam	13,567	1.9
495B	Corwin loam, 1 to 5 percent slopes	7,679	1.1
495C3	Corwin clay loam, 5 to 12 percent slopes, severely eroded	1,450	0.2
501	Morocco fine sand	5,650	0.8
513	Granby fine sandy loam	3,930	0.5
560E	St. Clair loam, 12 to 30 percent slopes	1,013	0.1
570B	Martinsville loam, 1 to 5 percent slopes	3,038	0.4
570C2	Martinsville loam, 5 to 10 percent slopes, eroded	1,150	0.2
570D2	Martinsville loam, 10 to 18 percent slopes, eroded	1,910	0.3
594	Reddick clay loam	8,393	1.2
741B	Oakville fine sand, 1 to 5 percent slopes	2,880	0.4
741C	Oakville fine sand, 5 to 12 percent slopes	850	0.1
776	Comfrey loam	4,110	0.6
779B	Chelsea fine sand, 1 to 5 percent slopes	8,515	1.2
779C	Chelsea fine sand, 5 to 12 percent slopes	3,550	0.5
802	Orthents, loamy	580	0.1
805	Orthents, clayey	850	0.1
	Water	1,970	0.3
	Total	718,080	100.0

TABLE 5.--PRIME FARMLAND

[Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name]

Map symbol	Soil name
27B	Miami silt loam, 1 to 5 percent slopes
59	Lisbon silt loam
69	Milford silty clay loam (where drained)
91A	Swygert silty clay loam, 0 to 2 percent slopes
91B	Swygert silty clay loam, 2 to 5 percent slopes
102	La Hogue loam
107	Sawmill silty clay loam (where drained and protected from flooding)
125	Selma loam (where drained)
131B	Alvin fine sandy loam, 1 to 5 percent slopes
141A	Wesley fine sandy loam, 0 to 3 percent slopes
145B2	Saybrook silt loam, 2 to 5 percent slopes, eroded
146A	Elliott loam, 0 to 2 percent slopes
146B	Elliott loam, 2 to 5 percent slopes
146B2	Elliott silty clay loam, 2 to 5 percent slopes, eroded
150B	Onarga fine sandy loam, 1 to 5 percent slopes
151	Ridgeville fine sandy loam
153	Pella clay loam (where drained)
178	Ruark fine sandy loam (where drained)
184	Roby loamy fine sand
189A	Martinton silty clay loam, 0 to 2 percent slopes
189B	Martinton silt loam, 2 to 5 percent slopes
189B2	Martinton silty clay loam, 2 to 5 percent slopes, eroded
192A	Del Rey silt loam, 0 to 2 percent slopes (where drained)
192B2	Del Rey silty clay loam, 2 to 7 percent slopes, eroded (where drained)
201	Gilford very fine sandy loam (where drained)
223B	Varna loam, 1 to 5 percent slopes
228B	Nappanee silt loam, 1 to 6 percent slopes (where drained)
229	Monee silty clay loam (where drained)
230	Rowe silty clay loam (where drained)
232	Ashkum silty clay loam (where drained)
235	Bryce silty clay (where drained)
284	Tice silt loam (where protected from flooding)
293	Andres loam
294B	Symerton silt loam, 1 to 5 percent slopes
295A	Mokena loam, 0 to 3 percent slopes
306A	Allison silty clay loam, 0 to 3 percent slopes
330	Peotone silty clay loam (where drained)
375B	Rutland silty clay loam, 1 to 5 percent slopes
398	Wea silt loam
405	Zook silty clay (where drained and protected from flooding)
440B	Jasper silt loam, 1 to 5 percent slopes
443B	Barrington silt loam, 1 to 3 percent slopes
484	Harco silt loam
490	Odell silt loam
495B	Corwin loam, 1 to 5 percent slopes
570B	Martinsville loam, 1 to 5 percent slopes
594	Reddick clay loam (where drained)
776	Comfrey loam (where drained and protected from flooding)

TABLE 6.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Soil name and map symbol	Corn	Soybeans	Winter wheat	Oats	Grass-legume hay	Bromegrass-alfalfa
	Bu	Bu	Bu	Bu	Ton	AUM*
27B Miami	110	38	50	---	3.6	---
49 Watseka	92	31	43	62	3.7	6.2
59 Lisbon	155	51	63	92	5.9	9.8
69 Milford	131	48	56	81	5.2	---
88B Sparta	70	25	---	25	2.2	3.5
91A Swygert	114	39	51	73	4.5	---
91B Swygert	113	39	50	72	4.5	---
102 La Hogue	129	43	56	80	5.2	8.6
103 Houghton	115	34	---	---	---	---
107 Sawmill	147	47	54	76	5.5	---
125 Selma	136	44	53	76	5.0	---
131B Alvin	97	33	48	---	4.3	7.1
141A Wesley	112	36	48	74	4.4	7.3
145B2 Saybrook	138	46	59	83	5.5	9.2
146A Elliott	128	45	55	79	5.1	8.5
146B Elliott	125	43	54	78	5.1	8.4
146B2 Elliott	115	40	50	71	4.6	7.7
147A Clarence	90	35	47	66	4.1	6.8
147B2 Clarence	76	34	46	65	4.0	6.7
150B Onarga	99	33	44	66	3.8	6.3
151 Ridgeville	115	40	53	75	4.6	7.7

See footnote at end of table.

TABLE 6.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Soybeans	Winter wheat	Oats	Grass-legume hay	Bromegrass-alfalfa
	Bu	Bu	Bu	Bu	Ton	AUM*
153-------------------- Pella	125	45	50	75	4.8	8.0
178-------------------- Ruark	100	35	44	73	3.5	---
184-------------------- Roby	98	36	45	73	4.0	6.7
189A------------------- Martinton	135	45	57	84	5.3	8.8
189B------------------- Martinton	130	43	56	83	5.2	8.7
189B2------------------ Martinton	120	40	59	80	5.0	8.4
192A------------------- Del Rey	115	37	49	69	4.5	7.5
192B2------------------ Del Rey	105	34	46	66	4.3	7.1
201-------------------- Gilford	120	42	54	100	4.0	---
223B------------------- Varna	122	41	52	74	4.8	7.9
228B------------------- Nappanee	100	28	47	80	3.5	---
229-------------------- Monee	87	32	41	55	3.3	5.5
230-------------------- Rowe	108	40	45	63	4.0	6.7
232-------------------- Ashkum	130	47	54	79	5.0	---
235-------------------- Bryce	120	43	48	70	4.4	---
238-------------------- Rantoul	99	35	36	50	3.2	---
241C------------------- Chatsworth	---	---	---	---	---	1.6
241D------------------- Chatsworth	---	---	---	---	---	1.0
284-------------------- Tice	153	47	---	---	3.4	5.7
293-------------------- Andres	145	48	61	88	5.5	9.1
294B------------------- Symerton	135	44	58	82	5.3	8.9
295A------------------- Mokena	126	41	55	77	4.7	7.8
306A------------------- Allison	149	48	---	---	4.0	6.7

See footnote at end of table.

TABLE 6.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Soybeans	Winter wheat	Oats	Grass-legume hay	Bromegrass-alfalfa
	Bu	Bu	Bu	Bu	Ton	AUM*
319----------------------- Aurelius	70	30	---	---	---	---
330----------------------- Peotone	123	42	43	58	4.2	---
375B---------------------- Rutland	131	45	58	83	5.2	8.7
398----------------------- Wea	120	42	48	---	4.0	---
405----------------------- Zook	92	35	---	69	3.5	---
440B---------------------- Jasper	125	44	50	---	4.1	---
443B---------------------- Barrington	129	42	54	84	5.3	8.9
484----------------------- Harco	154	47	62	87	5.6	---
490----------------------- Odell	130	46	58	---	4.3	---
495B---------------------- Corwin	130	42	54	---	4.0	6.6
495C3--------------------- Corwin	100	30	45	---	3.0	6.0
501----------------------- Morocco	80	28	36	45	2.6	---
513----------------------- Granby	75	30	35	55	---	---
560E---------------------- St. Clair	---	---	---	---	2.8	---
570B---------------------- Martinsville	120	42	48	---	4.0	---
570C2--------------------- Martinsville	105	37	42	---	3.4	---
570D2--------------------- Martinsville	90	32	36	---	3.0	---
594----------------------- Reddick	141	48	56	81	5.3	---
741B---------------------- Oakville	60	20	24	25	2.0	3.3
741C---------------------- Oakville	50	17	---	20	1.8	3.0
776----------------------- Comfrey	140	46	---	---	5.0	8.3
779B---------------------- Chelsea	66	21	25	25	2.0	3.3
779C---------------------- Chelsea	55	18	---	20	1.8	3.0

See footnote at end of table.

TABLE 6.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Soybeans	Winter wheat	Oats	Grass-legume hay	Bromegrass-alfalfa
	Bu	Bu	Bu	Bu	Ton	AUM*
802, 805. Orthents						

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
27B: Miami	1o	Slight	Slight	Slight	Slight	White oak Yellow-poplar Sweetgum	90 98 76	Eastern white pine, red pine, white ash, yellow-poplar, black walnut.
49: Watseka	---	---	---	---	---		---	Eastern white pine, red pine, green ash.
59: Lisbon	---	---	---	---	---		---	American sycamore, eastern cottonwood, green ash, eastern white pine, red pine.
69: Milford	---	---	---	---	---		---	Pin oak, green ash, red maple.
88B: Sparta	3s	Slight	Slight	Severe	Slight	Northern red oak Red pine Eastern white pine Jack pine	70 --- --- ---	Eastern white pine, red pine.
91A, 91B: Swygert	---	---	---	---	---		---	Green ash, pin oak.
102: La Hogue	---	---	---	---	---		---	American sycamore, eastern cottonwood, green ash, bur oak, eastern white pine.
103: Houghton	4w	Slight	Severe	Severe	Severe	White ash Red maple Quaking aspen Black willow Silver maple	51 51 56 --- 76	
107: Sawmill	2w	Slight	Moderate	Moderate	Moderate	Pin oak Eastern cottonwood Sweetgum Cherrybark oak American sycamore	90 --- --- --- ---	American sycamore, common hackberry, green ash, pin oak, red maple, swamp white oak.
125: Selma	---	---	---	---	---		---	American sycamore, common hackberry, green ash, pin oak, red maple, swamp white oak.
131B: Alvin	2o	Slight	Slight	Slight	Slight	White oak Northern red oak Black walnut Yellow-poplar	80 80 --- 90	Green ash, black walnut, yellow-poplar, white oak, eastern white pine, American sycamore, sugar maple.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Trees to plant
141A---------------- Wesley	---	--------	--------	--------	--------		---	American sycamore, eastern cottonwood, green ash, bur oak, eastern white pine.
145B2--------------- Saybrook	---	--------	--------	--------	--------		---	Black walnut, green ash, red maple, bur oak, eastern white pine, red pine.
146A, 146B, 146B2-- Elliott	---	--------	--------	--------	--------		---	White oak, northern red oak, green ash, sugar maple, eastern white pine.
147A, 147B2--------- Clarence	---	--------	--------	--------	--------		---	Jack pine.
150B---------------- Onarga	---	--------	--------	--------	--------		---	Eastern white pine, white oak, white ash, red pine, black walnut, green ash, northern red oak.
151----------------- Ridgeville	---	--------	--------	--------	--------		---	Eastern white pine, red pine.
153----------------- Pella	---	--------	--------	--------	--------		---	Pin oak, green ash.
178----------------- Ruark	3w	Slight	Moderate	Moderate	Slight	Pin oak------------ White oak---------- Green ash---------- Yellow-poplar-------	80 --- --- 80	Pin oak, green ash, red maple.
184----------------- Roby	2o	Slight	Slight	Slight	Slight	White oak---------- Northern red oak---- Yellow-poplar------- Black walnut--------	80 80 90 ---	Eastern cottonwood, American sycamore, yellow-poplar, white oak, eastern white pine.
189A, 189B, 189B2-- Martinton	---	--------	--------	--------	--------		---	Eastern white pine, American sycamore, green ash, eastern cottonwood, northern red oak, white oak.
192A, 192B2--------- Del Rey	3c	Slight	Slight	Severe	Severe	White oak---------- Northern red oak---- Green ash---------- Bur oak------------	70 70 --- ---	Austrian pine, green ash, pin oak, red maple.
201----------------- Gilford	4w	Slight	Severe	Severe	Severe	Pin oak------------ Eastern white pine-- Bigtooth aspen------ Red maple----------	70 55 70 60	Eastern white pine, white ash.
223B---------------- Varna	---	--------	--------	--------	--------		---	White oak, black walnut, northern red oak, green ash, sugar maple, eastern white pine.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
228B----- Nappanee	3c	Slight	Moderate	Severe	Severe	White oak----- Pin oak----- Sweetgum----- American sycamore---	75 85 80 ---	Eastern white pine, white ash, red maple, yellow-poplar, American sycamore.
229----- Monee	---	-------	-------	-------	-------		---	Green ash, pin oak.
230----- Rowe	---	-------	-------	-------	-------		---	Green ash.
232----- Ashkum	---	-------	-------	-------	-------		---	American sycamore, common hackberry, green ash, pin oak, red maple, swamp white oak.
238----- Rantoul	---	-------	-------	-------	-------		---	Green ash, pin oak.
293----- Andres	---	-------	-------	-------	-------		---	White oak, northern red oak, green ash, sugar maple, red pine.
294B----- Symerton	---	-------	-------	-------	-------		---	White oak, black walnut, northern red oak, green ash, sugar maple, eastern white pine.
295A----- Mokena	---	-------	-------	-------	-------		---	Eastern white pine, white oak, northern red oak, green ash, sugar maple.
306A----- Allison	---	-------	-------	-------	-------		---	Black walnut, eastern white pine, green ash, northern red oak, white ash, white oak.
330----- Peotone	---	-------	-------	-------	-------		---	Pin oak, green ash, red maple, American sycamore, common hackberry, eastern cottonwood, swamp white oak.
375B----- Rutland	---	-------	-------	-------	-------		---	American sycamore, eastern cottonwood, green ash, red maple, eastern white pine.
398----- Wea	---	-------	-------	-------	-------		---	Eastern white pine, red pine, yellow-poplar, white ash.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
440B---------------- Jasper	---	--------	--------	--------	--------		---	Eastern white pine, white ash, yellow-poplar, black walnut.
443B---------------- Barrington	---	--------	--------	--------	--------		---	Black walnut, eastern white pine, green ash, northern red oak, white ash, white oak.
484----------------- Harco	---	--------	--------	--------	--------		---	Yellow-poplar, white oak, white ash, American sycamore.
490----------------- Odell	---	--------	--------	--------	--------		---	Eastern white pine, white ash, red maple, yellow-poplar, American sycamore.
495B, 495C3--------- Corwin	---	--------	--------	--------	--------		---	Eastern white pine, white ash, yellow-poplar, black walnut.
501----------------- Morocco	3s	Slight	Slight	Severe	Slight	Northern red oak---- Pin oak------------- Eastern white pine--	70 85 65	Eastern white pine, red maple, American sycamore.
513----------------- Granby	4w	Slight	Severe	Severe	Severe	Pin oak------------- Quaking aspen------- Eastern white pine--	70 70 75	Eastern white pine, pin oak.
560E---------------- St. Clair	3c	Moderate	Moderate	Severe	Severe	Northern red oak---- White oak----------- White ash----------- Sugar maple---------	66 62 --- ---	Eastern white pine, yellow-poplar.
570B, 570C2, 570D2- Martinsville	1o	Slight	Slight	Slight	Slight	White oak----------- Yellow-poplar------- Sweetgum------------	90 98 76	Eastern white pine, red pine, white ash, yellow-poplar, black walnut.
594----------------- Reddick	---	--------	--------	--------	--------		---	Eastern cottonwood, pin oak, American sycamore, red maple, swamp white oak, green ash.
741B, 741C---------- Oakville	3s	Slight	Slight	Severe	Slight	White oak----------- Red pine------------ Eastern white pine-- Jack pine-----------	70 78 85 68	Eastern white pine, red pine.
779B, 779C---------- Chelsea	3s	Slight	Slight	Moderate	Slight	White oak----------- Red pine------------ Eastern white pine-- Jack pine----------- Quaking aspen------- Northern red oak----	70 72 83 70 72 70	Eastern white pine, red pine, jack pine.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS

[The symbol < means less than; > means more than. Absence of an entry indicates that trees generally do not grow to the given height on that soil]

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of-- <8	8-15	16-25	26-35	>35
27B. Miami	---	Amur honeysuckle, Amur privet, American cranberrybush, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
49. Watseka	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
59. Lisbon	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
69. Milford	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern white-cedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
88B. Sparta	Siberian peashrub	Eastern redcedar, radiant crabapple, Washington hawthorn, autumn-olive, Amur honeysuckle, lilac, Tatarian honeysuckle.	Austrian pine, jack pine, red pine.	Eastern white pine	---
91A, 91B. Swygert	---	American cranberrybush, Tatarian honeysuckle, Amur honeysuckle, arrowwood, Amur privet, Washington hawthorn, eastern redcedar.	Osageorange, green ash, Austrian pine.	Pin oak	---
102. La Hogue	---	Silky dogwood, Amur honeysuckle, American cranberrybush, Amur privet.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce	Pin oak, eastern white pine.
103. Houghton	Common ninebark, whitebelle honeysuckle.	Amur honeysuckle, Amur privet, silky dogwood, nannyberry viburnum, Tatarian honeysuckle.	Tall purple willow	Golden willow, black willow.	Imperial Carolina poplar.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of-- <8	8-15	16-25	26-35	>35
107--------------- Sawmill	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern white-cedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
125--------------- Selma	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern white-cedar, Austrian pine, Norway spruce.	Eastern white pine	---
131B-------------- Alvin	---	Amur privet, Washington hawthorn, Amur honeysuckle, American cranberrybush, Tatarian honeysuckle.	Austrian pine, northern white-cedar, osageorange, eastern redcedar.	Eastern white pine, red pine, Norway spruce.	---
141A-------------- Wesley	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
145B2------------- Saybrook	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
146A, 146B, 146B2- Elliott	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
147A, 147B2------- Clarence	---	Eastern redcedar, American cranberrybush, Amur privet, Washington hawthorn, Amur honeysuckle, autumn-olive, Tatarian honeysuckle.	Austrian pine, green ash, osageorange.	Eastern white pine, pin oak.	---
150B-------------- Onarga	---	Amur privet, Washington hawthorn, American cranberrybush, Tatarian honeysuckle, Amur honeysuckle.	Austrian pine, northern white-cedar, osageorange, eastern redcedar.	Red pine, Norway spruce, eastern white pine.	---
151--------------- Ridgeville	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of-- <8	8-15	16-25	26-35	>35
153. Pella	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern white-cedar, Austrian pine, Norway spruce.	Eastern white pine	---
178. Ruark	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern white-cedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
184. Roby	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
189A, 189B, 189B2. Martinton	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
192A, 192B2. Del Rey	---	Amur privet, arrowwood, eastern redcedar, Washington hawthorn, Amur honeysuckle, Tatarian honeysuckle, American cranberrybush.	Austrian pine, green ash, osageorange.	Eastern white pine, pin oak.	---
201. Gilford	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Norway spruce, northern white-cedar, Washington hawthorn, blue spruce, white fir, Austrian pine.	Eastern white pine	Pin oak.
223B. Varna	---	Eastern redcedar, Washington hawthorn, Amur honeysuckle, Amur privet, arrowwood, Tatarian honeysuckle, American cranberrybush.	Austrian pine, green ash, osageorange.	Eastern white pine, pin oak.	---
228B. Nappanee	---	Eastern redcedar, Washington hawthorn, Amur privet, American cranberrybush, arrowwood, Amur honeysuckle, Tatarian honeysuckle.	Austrian pine, green ash, osageorange.	Eastern white pine, pin oak.	---

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of-- <8	8-15	16-25	26-35	>35
229 Monee	---	American cranberrybush, Amur privet, Amur honeysuckle, silky dogwood.	Norway spruce, Washington hawthorn, Austrian pine, blue spruce, white fir, northern white-cedar.	Eastern white pine	Pin oak.
230 Rowe	---	American cranberrybush, Amur honeysuckle, Amur privet, silky dogwood.	Blue spruce, Norway spruce, northern white-cedar, Austrian pine, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
232 Ashkum	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Austrian pine, northern white-cedar, Norway spruce, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
235 Bryce	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern white-cedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
238 Rantoul	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern white-cedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
241C, 241D Chatsworth	Tatarian honeysuckle, lilac, Siberian peashrub.	Eastern redcedar, Russian-olive, osageorgange.	Northern catalpa, honeylocust.	---	---
284 Tice	---	Silky dogwood, Amur privet, American cranberrybush, Amur honeysuckle.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
293 Andres	---	Amur honeysuckle, Amur privet, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
294B Symerton	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Northern white-cedar, blue spruce, white fir, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
295A Mokena	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce	Pin oak, eastern white pine.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of-- <8	8-15	16-25	26-35	>35
306A: Allison	---	American cranberrybush, Amur honeysuckle, Amur privet, silky dogwood.	Blue spruce, northern white-cedar, Austrian pine, Washington hawthorn, white fir.	Norway spruce	Eastern white pine, pin oak.
319: Aurelius	Whitebelle honeysuckle, common ninebark.	Silky dogwood, Tatarian honeysuckle, Amur honeysuckle, nannyberry viburnum, Amur privet.	Tall purple willow	Black willow, golden willow.	Imperial Carolina poplar.
330: Peotone	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Norway spruce, Austrian pine, northern white-cedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
375B: Rutland	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
398: Wea	---	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	White fir, northern white-cedar, blue spruce, Washington hawthorn.	Norway spruce, Austrian pine.	Pin oak, eastern white pine.
405: Zook	---	Silky dogwood, Amur honeysuckle, American cranberrybush, Amur privet.	Norway spruce, northern white-cedar, Austrian pine, blue spruce, white fir, Washington hawthorn.	Eastern white pine	---
440B: Jasper	---	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	White fir, northern white-cedar, blue spruce, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
443B: Barrington	---	Amur honeysuckle, silky dogwood, Amur privet, American cranberrybush.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Pin oak, eastern white pine.
484: Harco	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern white-cedar, blue spruce, white fir, Austrian pine.	Norway spruce	Pin oak, eastern white pine.
490: Odell	---	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	White fir, Austrian pine, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of--				
	<8	8-15	16-25	26-35	>35
495B, 495C3: Corwin	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine.
501: Morocco	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
513: Granby	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Norway spruce, Austrian pine, northern white-cedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
560E: St. Clair	---	Arrowwood, eastern redcedar, Washington hawthorn, Amur honeysuckle, American cranberrybush, Amur privet, Tatarian honeysuckle.	Austrian pine, green ash, osageorange.	Eastern white pine, pin oak.	---
570B, 570C2, 570D2: Martinsville	---	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
594: Reddick	---	Washington hawthorn, nannyberry viburnum, Tatarian honeysuckle.	Osageorange, green ash, eastern redcedar, northern white-cedar, white spruce.	Black willow	---
741B, 741C: Oakville	Siberian peashrub	Eastern redcedar, lilac, radiant crabapple, autumn-olive, Washington hawthorn, Amur honeysuckle, Tatarian honeysuckle.	Red pine, Austrian pine, jack pine.	Eastern white pine	---
776: Comfrey	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern white-cedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of--				
	<8	8-15	16-25	26-35	>35
779B, 779C-------- Chelsea	Siberian peashrub	Eastern redcedar, radiant crabapple, Washington hawthorn, autumn-olive, Amur honeysuckle, lilac, Tatarian honeysuckle.	Austrian pine, jack pine, red pine.	Eastern white pine	---
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TABLE 9.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
27B-------------------- Miami	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight------------	Slight.
49--------------------- Watseka	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, droughty.
59--------------------- Lisbon	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
69--------------------- Milford	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
88B-------------------- Sparta	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty.
91A, 91B--------------- Swygert	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Severe: erodes easily.	Moderate: droughty.
102-------------------- La Hogue	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
103-------------------- Houghton	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.
107-------------------- Sawmill	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
125-------------------- Selma	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
131B------------------- Alvin	Slight----------	Slight----------	Moderate: slope.	Slight------------	Slight.
141A------------------- Wesley	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
145B2------------------ Saybrook	Slight----------	Slight----------	Moderate: slope.	Slight------------	Slight.
146A, 146B, 146B2----- Elliott	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
147A, 147B2----------- Clarence	Severe: wetness, percs slowly.	Severe: percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
150B------------------- Onarga	Slight----------	Slight----------	Moderate: slope.	Slight------------	Slight.
151-------------------- Ridgeville	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
153-------------------- Pella	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
178-------------------- Ruark	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
184 Roby	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, droughty.
189A, 189B, 189B2 Martinton	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
192A, 192B2 Del Rey	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
201 Gilford	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
223B Varna	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Slight.
228B Nappanee	Severe: wetness.	Moderate: percs slowly, wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
229 Monee	Severe: ponding, percs slowly.	Severe: ponding, percs slowly.	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.
230 Rowe	Severe: ponding, percs slowly.	Severe: ponding, percs slowly.	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.
232 Ashkum	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
235 Bryce	Severe: ponding, percs slowly, too clayey.	Severe: ponding, too clayey, percs slowly.	Severe: too clayey, ponding, percs slowly.	Severe: ponding, too clayey.	Severe: ponding, too clayey.
238 Rantoul	Severe: ponding, percs slowly, too clayey.	Severe: ponding, too clayey, percs slowly.	Severe: too clayey, ponding, percs slowly.	Severe: ponding, too clayey.	Severe: ponding, too clayey.
241C Chatsworth	Severe: percs slowly, too clayey.	Severe: too clayey, percs slowly.	Severe: slope, too clayey, percs slowly.	Severe: too clayey.	Severe: droughty, too clayey.
241D Chatsworth	Severe: slope, percs slowly, too clayey.	Severe: slope, too clayey, percs slowly.	Severe: slope, too clayey, percs slowly.	Severe: too clayey.	Severe: droughty, slope, too clayey.
284 Tice	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: wetness, flooding.	Moderate: wetness, flooding.	Severe: flooding.
293 Andres	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
294B Symerton	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Slight.
295A Mokena	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
306A------------------ Allison	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
319------------------- Aurelius	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
330------------------- Peotone	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
375B------------------ Rutland	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
398------------------- Wea	Slight----------	Slight----------	Slight----------	Slight------------	Slight.
405------------------- Zook	Severe: wetness, flooding, too clayey.	Severe: too clayey, wetness.	Severe: too clayey, wetness, flooding.	Severe: too clayey, wetness.	Severe: too clayey, flooding, wetness.
440B------------------ Jasper	Slight----------	Slight----------	Moderate: slope.	Slight------------	Slight.
443B------------------ Barrington	Slight----------	Slight----------	Moderate: slope.	Slight------------	Slight.
484------------------- Harco	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
490------------------- Odell	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
495B------------------ Corwin	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight------------	Slight.
495C3----------------- Corwin	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight------------	Moderate: slope.
501------------------- Morocco	Severe: wetness, too sandy.	Severe: too sandy.	Severe: too sandy, wetness.	Severe: too sandy.	Moderate: wetness, droughty.
513------------------- Granby	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
560E------------------ St. Clair	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Severe: slope.
570B------------------ Martinsville	Slight----------	Slight----------	Moderate: slope.	Slight------------	Slight.
570C2----------------- Martinsville	Slight----------	Slight----------	Severe: slope.	Slight------------	Slight.
570D2----------------- Martinsville	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
594------------------- Reddick	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
741B------------------ Oakville	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
741C------------------ Oakville	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Moderate: slope, droughty.
776------------------- Comfrey	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
779B------------------ Chelsea	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty.
779C------------------ Chelsea	Severe: too sandy.	Severe: too sandy.	Severe: too sandy, slope.	Severe: too sandy.	Moderate: slope, droughty.
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TABLE 10.--WILDLIFE HABITAT POTENTIALS

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
27B Miami	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
49 Watseka	Fair	Fair	Good	Good	Fair	Poor	Fair	Good	Poor.
59 Lisbon	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
69 Milford	Good	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
88B Sparta	Fair	Fair	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor.
91A, 91B Swygert	Fair	Good	Good	Good	Fair	Poor	Good	Good	Poor.
102 La Hogue	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
103 Houghton	Fair	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
107 Sawmill	Good	Good	Good	Fair	Good	Fair	Good	Fair	Fair.
125 Selma	Good	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
131B Alvin	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
141A Wesley	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
145B2 Saybrook	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
146A Elliott	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
146B, 146B2 Elliott	Fair	Good	Good	Good	Poor	Poor	Good	Good	Poor.
147A Clarence	Fair	Good	Fair	Good	Fair	Fair	Fair	Good	Fair.
147B2 Clarence	Fair	Good	Fair	Good	Poor	Very poor	Fair	Good	Very poor.
150B Onarga	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
151 Ridgeville	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
153 Pella	Good	Good	Good	Fair	Good	Good	Good	Fair	Good.
178 Ruark	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.

TABLE 10.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements						Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
184----------------- Roby	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
189A---------------- Martinton	Fair	Good	Fair	Good	Fair	Fair	Fair	Good	Fair.
189B, 189B2--------- Martinton	Fair	Good	Fair	Good	Fair	Poor	Fair	Good	Poor.
192A---------------- Del Rey	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
192B2--------------- Del Rey	Fair	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
201----------------- Gilford	Fair	Poor	Poor	Poor	Good	Good	Fair	Poor	Good.
223B---------------- Varna	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
228B---------------- Nappanee	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
229----------------- Monee	Poor	Fair	Fair	Poor	Good	Good	Fair	Poor	Good.
230----------------- Rowe	Poor	Fair	Poor	Fair	Good	Good	Fair	Fair	Good.
232----------------- Ashkum	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
235----------------- Bryce	Good	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
238----------------- Rantoul	Good	Good	Good	Fair	Good	Good	Good	Fair	Good.
241C, 241D---------- Chatsworth	Very poor	Poor	Poor	Very poor	Very poor	Very poor	Poor	Very poor	Very poor.
284----------------- Tice	Poor	Fair	Fair	Good	Fair	Fair	Fair	Good	Fair.
293----------------- Andres	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
294B---------------- Symerton	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
295A---------------- Mokena	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
306A---------------- Allison	Poor	Fair	Fair	Good	Poor	Poor	Fair	Good	Poor.
319----------------- Aurelius	Fair	Fair	Poor	Poor	Good	Good	Fair	Poor	Good.
330----------------- Peotone	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
375B---------------- Rutland	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
398----------------- Wea	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.

TABLE 10.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements						Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
405------------------- Zook	Good	Fair	Good	Fair	Good	Good	Fair	Fair	Good.
440B------------------ Jasper	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
443B------------------ Barrington	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
484------------------- Harco	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
490------------------- Odell	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
495B, 495C3----------- Corwin	Good	Good	Good	Good	Poor	Fair	Good	Good	Poor.
501------------------- Morocco	Poor	Poor	Good	Fair	Poor	Very poor	Fair	Fair	Very poor.
513------------------- Granby	Fair	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
560E------------------ St. Clair	Poor	Fair	Good	Good	Very poor	Very poor	Fair	Good	Very poor.
570B------------------ Martinsville	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
570C2----------------- Martinsville	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
570D2----------------- Martinsville	Poor	Fair	Good	Good	Very poor	Very poor	Fair	Good	Very poor.
594------------------- Reddick	Good	Good	Good	Good	Good	Good	Good	Good	Poor.
741B------------------ Oakville	Poor	Poor	Fair	Fair	Poor	Very poor	Poor	Fair	Very poor.
741C------------------ Oakville	Poor	Poor	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor.
776------------------- Comfrey	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
779B, 779C------------ Chelsea	Poor	Fair	Fair	Poor	Very poor	Very poor	Fair	Poor	Very poor.
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TABLE 11.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
27B: Miami	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: frost action, low strength.	Slight.
49: Watseka	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness, frost action.	Moderate: wetness, droughty.
59: Lisbon	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
69: Milford	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
88B: Sparta	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: droughty.
91A, 91B: Swygert	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: low strength, frost action, shrink-swell.	Moderate: droughty.
102: La Hogue	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Moderate: wetness.
103: Houghton	Severe: ponding, excess humus.	Severe: ponding, low strength.	Severe: ponding, low strength.	Severe: ponding, low strength.	Severe: ponding, low strength, frost action.	Severe: excess humus, ponding.
107: Sawmill	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness, flooding, low strength.	Severe: wetness, flooding.
125: Selma	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding.
131B: Alvin	Severe: cutbanks cave.	Slight	Slight	Slight	Moderate: frost action.	Slight.
141A: Wesley	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
145B2: Saybrook	Moderate: wetness.	Slight	Moderate: wetness.	Slight	Severe: frost action, low strength.	Slight.
146A, 146B, 146B2: Elliott	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
147A, 147B2: Clarence	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength.	Moderate: wetness.
150B: Onarga	Severe: cutbanks cave.	Slight	Slight	Slight	Moderate: frost action.	Slight.
151: Ridgeville	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Moderate: wetness.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
153---------------- Pella	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
178---------------- Ruark	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
184---------------- Roby	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Moderate: wetness, droughty.
189A, 189B, 189B2- Martinton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
192A, 192B2-------- Del Rey	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
201---------------- Gilford	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding.
223B--------------- Varna	Moderate: too clayey, wetness.	Moderate: shrink-swell.	Moderate: wetness.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
228B--------------- Nappanee	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength.	Moderate: wetness.
229---------------- Monee	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: low strength, ponding, shrink-swell.	Severe: ponding.
230---------------- Rowe	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: low strength, ponding, shrink-swell.	Severe: ponding.
232---------------- Ashkum	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
235---------------- Bryce	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: low strength, ponding, frost action.	Severe: ponding, too clayey.
238---------------- Rantoul	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: low strength, ponding, shrink-swell.	Severe: ponding, too clayey.
241C--------------- Chatsworth	Moderate: too clayey, dense layer.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Severe: droughty, too clayey.
241D--------------- Chatsworth	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: droughty, slope, too clayey.
284---------------- Tice	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding, frost action.	Severe: flooding.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
293 Andres	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
294B Symerton	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
295A Mokena	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
306A Allison	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding, frost action.	Severe: flooding.
319 Aurelius	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding, excess humus.
330 Peotone	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: low strength, ponding, frost action.	Severe: ponding.
375B Rutland	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, frost action, shrink-swell.	Moderate: wetness.
398 Wea	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
405 Zook	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, low strength, frost action.	Severe: too clayey, flooding, wetness.
440B Jasper	Slight	Slight	Slight	Slight	Moderate: low strength, frost action.	Slight.
443B Barrington	Moderate: wetness.	Slight	Moderate: wetness.	Slight	Severe: frost action.	Slight.
484 Harco	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
490 Odell	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Moderate: wetness.
495B Corwin	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness.	Moderate: shrink-swell.	Severe: low strength.	Slight.
495C3 Corwin	Moderate: wetness, slope.	Moderate: shrink-swell, slope.	Moderate: wetness, slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
501 Morocco	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness, frost action.	Moderate: wetness, droughty.
513 Granby	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
560E St. Clair	Severe: wetness, slope.	Severe: shrink-swell, slope.	Severe: wetness, slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.	Severe: slope.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
570B: Martinsville	Severe: cutbanks cave.	Slight	Slight	Slight	Moderate: low strength, frost action.	Slight.
570C2: Martinsville	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: low strength, frost action.	Slight.
570D2: Martinsville	Severe: cutbanks cave.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: low strength, slope, frost action.	Moderate: slope.
594: Reddick	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness, frost action.	Severe: wetness.
741B: Oakville	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: droughty.
741C: Oakville	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope, droughty.
776: Comfrey	Severe: wetness, excess humus.	Severe: flooding, wetness, low strength.	Severe: flooding, wetness.	Severe: flooding, wetness, low strength.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
779B: Chelsea	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: droughty.
779C: Chelsea	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope, droughty.
802, 805. Orthents						

TABLE 12.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
27B Miami	Severe: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
49 Watseka	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: wetness, seepage, too sandy.	Severe: seepage, wetness.	Poor: too sandy, wetness, seepage.
59 Lisbon	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
69 Milford	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
88B Sparta	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
91A, 91B Swygert	Severe: wetness, percs slowly.	Severe: wetness.	Severe: too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
102 La Hogue	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy, wetness.
103 Houghton	Severe: ponding, percs slowly.	Severe: seepage, ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, seepage.	Poor: ponding, excess humus.
107 Sawmill	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.	Poor: wetness.
125 Selma	Severe: ponding.	Severe: seepage, ponding.	Severe: seepage, ponding.	Severe: ponding.	Poor: ponding.
131B Alvin	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: thin layer.
141A Wesley	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage, wetness.	Poor: wetness.
145B2 Saybrook	Moderate: percs slowly, wetness.	Moderate: slope, seepage, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
146A, 146B, 146B2 Elliott	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
147A, 147B2 Clarence	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
150B----------------- Onarga	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: thin layer.
151------------------ Ridgeville	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
153------------------ Pella	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
178------------------ Ruark	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
184------------------ Roby	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
189A, 189B, 189B2--- Martinton	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
192A----------------- Del Rey	Severe: wetness, percs slowly.	Slight-----------	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
192B2---------------- Del Rey	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
201------------------ Gilford	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
223B----------------- Varna	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness, too clayey.	Slight-----------	Fair: too clayey, wetness.
228B----------------- Nappanee	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
229------------------ Monee	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
230------------------ Rowe	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
232------------------ Ashkum	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
235------------------ Bryce	Severe: ponding, percs slowly.	Slight-----------	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
238-----------------Rantoul	Severe: ponding, percs slowly.	Slight-----------	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
241C----------------Chatsworth	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Slight-----------	Poor: too clayey, hard to pack.
241D----------------Chatsworth	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
284-----------------Tice	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: hard to pack, wetness.
293-----------------Andres	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
294B----------------Symerton	Severe: wetness, percs slowly.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
295A----------------Mokena	Severe: wetness, percs slowly.	Slight-----------	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
306A----------------Allison	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Poor: thin layer.
319-----------------Aurelius	Severe: ponding.	Severe: excess humus, ponding.	Severe: ponding, too sandy.	Severe: ponding.	Poor: too sandy, ponding.
330-----------------Peotone	Severe: ponding, percs slowly.	Slight-----------	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
375B----------------Rutland	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
398-----------------Wea	Slight-----------	Moderate: seepage.	Severe: seepage.	Slight-----------	Fair: too clayey.
405-----------------Zook	Severe: percs slowly, wetness, flooding.	Severe: wetness, flooding.	Severe: wetness, too clayey, flooding.	Severe: wetness, flooding.	Poor: too clayey, wetness, hard to pack.
440B----------------Jasper	Slight-----------	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey.
443B----------------Barrington	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
484-----------------Harco	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
490 Odell	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
495B Corwin	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Slight	Fair: wetness.
495C3 Corwin	Severe: wetness, percs slowly.	Severe: slope, wetness.	Moderate: wetness, slope.	Moderate: slope.	Fair: slope, wetness.
501 Morocco	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, too sandy, wetness.	Severe: seepage, wetness.	Poor: too sandy, wetness, seepage.
513 Granby	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
560E St. Clair	Severe: wetness, percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
570B Martinsville	Slight	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, thin layer.
570C2 Martinsville	Slight	Severe: slope.	Moderate: too clayey.	Slight	Fair: too clayey, thin layer.
570D2 Martinsville	Moderate: slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope, thin layer.
594 Reddick	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
741B Oakville	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage.
741C Oakville	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage.
776 Comfrey	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
779B Chelsea	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage.
779C Chelsea	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage.
802, 805. Orthents					

TABLE 13.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," "probable," and "improbable." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
27B------------------- Miami	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim.
49-------------------- Watseka	Fair: wetness.	Probable--------------	Improbable: too sandy.	Fair: too sandy.
59-------------------- Lisbon	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
69-------------------- Milford	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
88B------------------- Sparta	Good------------------	Probable--------------	Improbable: too sandy.	Poor: too sandy.
91A, 91B-------------- Swygert	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
102------------------- La Hogue	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
103------------------- Houghton	Poor: wetness, low strength.	Improbable: excess humus.	Improbable: excess humus.	Poor: wetness, excess humus.
107------------------- Sawmill	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
125------------------- Selma	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
131B------------------ Alvin	Good------------------	Probable--------------	Improbable: too sandy.	Good.
141A------------------ Wesley	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
145B2----------------- Saybrook	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
146A, 146B, 146B2----- Elliott	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
147A, 147B2----------- Clarence	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too clayey, small stones.
150B------------------ Onarga	Good------------------	Probable--------------	Improbable: too sandy.	Fair: area reclaim, thin layer.
151------------------- Ridgeville	Fair: wetness.	Probable--------------	Improbable: too sandy.	Good.
153------------------- Pella	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
178------------------- Ruark	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
184 Roby	Fair: wetness.	Probable	Improbable: too sandy.	Poor: thin layer.
189A, 189B, 189B2 Martinton	Fair: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
192A, 192B2 Del Rey	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
201 Gilford	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness.
223B Varna	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
228B Nappanee	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
229 Monee	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
230 Rowe	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
232 Ashkum	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
235 Bryce	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
238 Rantoul	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
241C, 241D Chatsworth	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
284 Tice	Fair: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Good.
293 Andres	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
294B Symerton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
295A Mokena	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, thin layer.
306A Allison	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
319 Aurelius	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
330 Peotone	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
375B Rutland	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
398 Wea	Good	Probable	Probable	Fair: small stones.
405 Zook	Poor: shrink-swell, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
440B Jasper	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
443B Barrington	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
484 Harco	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
490 Odell	Fair: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
495B Corwin	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
495C3 Corwin	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, slope.
501 Morocco	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
513 Granby	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness.
560E St. Clair	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
570B, 570C2 Martinsville	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
570D2 Martinsville	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
594 Reddick	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
741B, 741C Oakville	Good	Probable	Improbable: too sandy.	Poor: too sandy.
776 Comfrey	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
779B, 779C Chelsea	Good	Probable	Improbable: too sandy.	Poor: too sandy.
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TABLE 14.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated]

Soil name and map symbol	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
27B: Miami	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope	Erodes easily	Erodes easily.
49: Watseka	Severe: seepage.	Severe: piping, seepage, wetness.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.
59: Lisbon	Moderate: seepage.	Severe: wetness.	Frost action	Wetness	Erodes easily, wetness.	Wetness, erodes easily.
69: Milford	Slight	Severe: ponding.	Ponding, frost action.	Ponding	Erodes easily, ponding.	Wetness, erodes easily.
88B: Sparta	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.
91A: Swygert	Slight	Moderate: hard to pack, wetness.	Percs slowly, frost action.	Wetness, droughty, percs slowly.	Erodes easily, wetness, percs slowly.	Erodes easily, droughty, rooting depth.
91B: Swygert	Moderate: slope.	Moderate: hard to pack, wetness.	Percs slowly, frost action, slope.	Wetness, droughty, percs slowly.	Erodes easily, wetness, percs slowly.	Erodes easily, droughty, rooting depth.
102: La Hogue	Severe: seepage.	Severe: piping, wetness.	Frost action, cutbanks cave.	Wetness	Wetness, too sandy.	Wetness.
103: Houghton	Severe: seepage.	Severe: excess humus, ponding.	Frost action, subsides, ponding.	Soil blowing, ponding.	Ponding, soil blowing.	Wetness.
107: Sawmill	Moderate: seepage.	Severe: wetness, piping.	Flooding, frost action.	Wetness, flooding.	Wetness	Wetness.
125: Selma	Moderate: seepage.	Severe: ponding.	Ponding, frost action.	Ponding	Ponding	Wetness.
131B: Alvin	Severe: seepage.	Severe: piping.	Deep to water	Soil blowing, slope.	Soil blowing	Favorable.
141A: Wesley	Severe: seepage.	Moderate: piping, wetness.	Frost action	Wetness	Erodes easily, wetness, soil blowing.	Wetness, erodes easily.
145B2: Saybrook	Moderate: seepage, slope.	Moderate: piping.	Deep to water	Slope	Erodes easily	Erodes easily.
146A: Elliott	Slight	Severe: wetness.	Percs slowly, frost action.	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
146B, 146B2: Elliott	Moderate: slope.	Severe: wetness.	Percs slowly, frost action, slope.	Wetness, percs slowly, slope.	Wetness, percs slowly.	Wetness, percs slowly.
147A: Clarence	Slight	Moderate: hard to pack, wetness.	Percs slowly	Wetness	Wetness, percs slowly.	Wetness, rooting depth.
147B2: Clarence	Moderate: slope.	Moderate: hard to pack, wetness.	Percs slowly, slope.	Wetness	Wetness, percs slowly.	Wetness, rooting depth.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
150B Onarga	Severe: seepage.	Severe: piping.	Deep to water	Soil blowing, slope.	Soil blowing	Favorable.
151 Ridgeville	Severe: seepage.	Severe: seepage, piping, wetness.	Frost action, cutbanks cave.	Wetness, soil blowing.	Wetness, too sandy, soil blowing.	Wetness.
153 Pella	Moderate: seepage.	Severe: piping, ponding.	Ponding, frost action.	Ponding	Ponding	Wetness.
178 Ruark	Moderate: seepage.	Severe: piping, ponding.	Ponding, frost action.	Ponding, soil blowing.	Ponding, soil blowing.	Wetness.
184 Roby	Severe: seepage.	Severe: seepage, piping, wetness.	Frost action, cutbanks cave.	Wetness, droughty, soil blowing.	Wetness, too sandy, soil blowing.	Wetness, droughty, rooting depth.
189A Martinton	Slight	Severe: wetness.	Frost action	Wetness	Erodes easily, wetness.	Wetness, erodes easily.
189B, 189B2 Martinton	Moderate: slope.	Severe: wetness.	Frost action, slope.	Wetness, slope.	Erodes easily, wetness.	Wetness, erodes easily.
192A Del Rey	Slight	Severe: wetness.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
192B2 Del Rey	Moderate: slope.	Severe: wetness.	Percs slowly, frost action, slope.	Wetness, percs slowly, slope.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
201 Gilford	Severe: seepage.	Severe: seepage, piping, ponding.	Ponding, frost action, cutbanks cave.	Ponding, soil blowing.	Ponding, too sandy, soil blowing.	Wetness.
223B Varna	Moderate: slope.	Moderate: piping.	Deep to water	Percs slowly, slope.	Percs slowly	Percs slowly.
228B Nappanee	Moderate: slope.	Moderate: wetness, hard to pack.	Percs slowly, slope.	Wetness, percs slowly, slope.	Erodes easily, wetness.	Wetness, erodes easily.
229 Monee	Slight	Severe: ponding.	Ponding, percs slowly.	Ponding, percs slowly.	Erodes easily, ponding, percs slowly.	Wetness, erodes easily, percs slowly.
230 Rowe	Slight	Severe: hard to pack, ponding.	Ponding, percs slowly.	Ponding, percs slowly.	Ponding, percs slowly.	Wetness, percs slowly.
232 Ashkum	Slight	Severe: ponding.	Ponding, frost action.	Ponding	Ponding	Wetness.
235 Bryce	Slight	Severe: ponding.	Ponding, percs slowly, frost action.	Ponding, droughty, slow intake.	Ponding, percs slowly.	Wetness, droughty, rooting depth.
238 Rantoul	Slight	Severe: hard to pack, ponding.	Ponding, percs slowly.	Ponding, slow intake, percs slowly.	Ponding, percs slowly.	Wetness, percs slowly.
241C Chatsworth	Moderate: slope.	Moderate: hard to pack.	Deep to water	Droughty, slow intake, percs slowly.	Percs slowly	Droughty.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
241D: Chatsworth	Severe: slope.	Moderate: hard to pack.	Deep to water	Droughty, slow intake, percs slowly.	Slope, percs slowly.	Slope, droughty.
284: Tice	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness, flooding.	Wetness	Wetness.
293: Andres	Moderate: seepage.	Severe: wetness.	Frost action	Wetness	Wetness	Wetness.
294B: Symerton	Moderate: seepage, slope.	Moderate: piping, wetness.	Deep to water	Slope	Erodes easily	Erodes easily.
295A: Mokena	Slight	Moderate: hard to pack, wetness.	Percs slowly, frost action.	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
306A: Allison	Moderate: seepage.	Moderate: piping.	Deep to water	Flooding	Favorable	Favorable.
319: Aurelius	Severe: seepage.	Severe: piping, ponding.	Ponding, subsides, frost action.	Ponding, soil blowing, rooting depth.	Ponding, too sandy, soil blowing.	Wetness, rooting depth.
330: Peotone	Slight	Severe: ponding.	Ponding, frost action.	Ponding	Ponding	Wetness.
375B: Rutland	Moderate: slope.	Severe: wetness.	Frost action, slope.	Wetness, percs slowly, slope.	Erodes easily, wetness.	Wetness, erodes easily.
398: Wea	Moderate: seepage.	Moderate: thin layer.	Deep to water	Favorable	Erodes easily	Erodes easily.
405: Zook	Slight	Severe: hard to pack, wetness.	Flooding, percs slowly, frost action.	Wetness, slow intake, percs slowly.	Not needed	Not needed.
440B: Jasper	Moderate: seepage, slope.	Moderate: thin layer, piping.	Deep to water	Slope	Favorable	Favorable.
443B: Barrington	Moderate: seepage.	Severe: piping.	Deep to water	Favorable	Erodes easily	Erodes easily.
484: Harco	Moderate: seepage.	Severe: thin layer, wetness.	Frost action	Wetness	Wetness	Wetness.
490: Odell	Slight	Severe: piping, wetness.	Frost action	Wetness	Wetness, erodes easily.	Wetness, erodes easily.
495B: Corwin	Moderate: seepage, slope.	Severe: piping.	Deep to water	Percs slowly, slope.	Erodes easily	Erodes easily, percs slowly.
495C3: Corwin	Severe: slope.	Severe: piping.	Deep to water	Percs slowly, slope.	Slope, erodes easily.	Slope, erodes easily, percs slowly.
501: Morocco	Severe: seepage.	Severe: seepage, piping, wetness.	Cutbanks cave	Droughty, fast intake, wetness.	Wetness, too sandy, soil blowing.	Wetness, droughty.
513: Granby	Severe: seepage.	Severe: seepage, piping, ponding.	Ponding, cutbanks cave.	Ponding, droughty.	Ponding, too sandy, soil blowing.	Wetness, droughty.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
560E--------------- St. Clair	Severe: slope.	Moderate: hard to pack, wetness.	Percs slowly, slope.	Wetness, percs slowly, rooting depth.	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
570B, 570C2-------- Martinsville	Moderate: seepage, slope.	Severe: thin layer.	Deep to water	Slope----------	Erodes easily	Erodes easily.
570D2-------------- Martinsville	Severe: slope.	Severe: thin layer.	Deep to water	Slope----------	Slope, erodes easily.	Slope, erodes easily.
594---------------- Reddick	Moderate: seepage.	Severe: wetness.	Percs slowly, frost action.	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
741B--------------- Oakville	Severe: seepage.	Severe: piping, seepage.	Deep to water	Fast intake, droughty, soil blowing.	Too sandy, soil blowing.	Droughty.
741C--------------- Oakville	Severe: seepage, slope.	Severe: piping, seepage.	Deep to water	Fast intake, droughty, soil blowing.	Slope, too sandy, soil blowing.	Slope, droughty.
776---------------- Comfrey	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness, flooding.	Wetness--------	Wetness.
779B--------------- Chelsea	Severe: seepage.	Severe: piping, seepage.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.
779C--------------- Chelsea	Severe: slope, seepage.	Severe: piping, seepage.	Deep to water	Droughty, fast intake, soil blowing.	Slope, too sandy, soil blowing.	Slope, droughty.
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TABLE 15.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
27B------------- Miami	0-11	Silt loam--------	CL, CL-ML, ML	A-4	0	100	95-100	80-100	50-90	15-30	3-10
	11-28	Clay loam, silty clay loam, loam.	CL, SC	A-6	0	90-100	85-100	70-95	40-95	30-40	15-25
	28-60	Loam, clay loam, sandy loam.	CL, CL-ML, SC, SM-SC	A-4, A-6	0-3	85-100	85-100	70-90	45-70	20-40	5-20
49-------------- Watseka	0-14	Loamy sand-------	SM, SM-SC	A-2	0	100	95-100	80-100	17-35	<25	NP-5
	14-60	Fine sand, sand, loamy fine sand.	SP, SM, SP-SM	A-3, A-2	0	90-100	90-100	60-80	3-25	<20	NP-4
59-------------- Lisbon	0-14	Silt loam--------	ML	A-6, A-7	0	100	100	95-100	80-95	35-50	10-20
	14-39	Silty clay loam, silt loam.	CL, CH	A-7, A-6	0	100	95-100	95-100	80-98	35-55	15-35
	39-60	Loam, clay loam, silty clay loam.	CL	A-4, A-6, A-7	0-5	90-100	90-100	85-100	70-85	20-45	8-25
69-------------- Milford	0-18	Silty clay loam	CL, CH	A-7	0	100	95-100	90-100	80-95	40-60	20-35
	18-50	Silty clay, silty clay loam, clay loam.	CH, CL	A-7	0	100	95-100	90-100	75-100	40-60	20-40
	50-60	Stratified clay to sandy loam.	CL	A-6, A-7	0	97-100	95-100	90-100	70-100	30-50	15-30
88B------------- Sparta	0-21	Fine sand--------	SP-SM, SM	A-3, A-2	0	85-100	85-100	50-75	5-35	---	NP
	21-44	Loamy fine sand, fine sand, sand.	SP-SM, SM	A-2, A-3, A-4	0	85-100	85-100	50-95	5-50	---	NP
	44-60	Sand, fine sand	SP-SM, SM, SP	A-2, A-3	0	85-100	85-100	50-95	2-30	---	NP
91A, 91B--------- Swygert	0-12	Silty clay loam	CL	A-7, A-6	0	100	95-100	95-100	85-95	35-50	15-25
	12-18	Silty clay, silty clay loam.	CL, CH	A-7, A-6	0	100	95-100	95-100	85-95	35-55	15-30
	18-31	Silty clay, clay, silty clay loam.	CH	A-7	0-5	95-100	95-100	90-100	75-95	50-60	25-35
	31-60	Silty clay loam, silty clay, clay.	CH, CL	A-7	0-5	95-100	95-100	90-100	75-95	40-65	20-40
102------------- La Hogue	0-12	Loam-------------	ML, CL, CL-ML	A-4	0	100	95-100	80-100	50-80	20-35	3-10
	12-39	Clay loam, loam, silty clay loam.	CL, SC	A-6, A-4	0	100	100	80-100	40-85	25-40	8-20
	39-60	Loamy fine sand	CL, CL-ML, SC, SM-SC	A-4, A-2	0	90-100	80-100	50-95	20-60	<25	5-10
103------------- Houghton	0-60	Sapric material	Pt	A-8	0	---	---	---	---	---	---
107------------- Sawmill	0-30	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	85-100	30-50	15-30
	30-60	Silty clay loam, clay loam, loam.	CL	A-6, A-7, A-4	0	100	100	85-100	70-95	25-50	8-25
125------------- Selma	0-12	Loam-------------	CL	A-4, A-6	0	100	98-100	80-98	55-85	25-35	7-17
	12-44	Sandy loam, loam, silty clay loam.	CL, SC	A-6	0	100	95-100	80-95	38-85	24-36	11-19
	44-60	Stratified sand to silt loam.	SM-SC, SC, CL-ML, CL	A-2, A-4, A-6	0	90-100	85-100	60-90	30-70	15-35	5-20
131B------------ Alvin	0-8	Fine sandy loam	SM, ML	A-4, A-2	0	100	100	80-95	30-60	<25	NP-4
	8-45	Very fine sandy loam, sandy loam, sandy clay loam.	SM, SC, CL, ML	A-2, A-4, A-6	0	100	100	90-100	20-80	15-38	NP-13
	45-60	Stratified sandy loam to fine sand.	SM, SP, SP-SM	A-2, A-3	0-5	95-100	90-100	70-95	4-35	<20	NP-4

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
141A------------- Wesley	0-11	Fine sandy loam	SM, SM-SC	A-2, A-4	0	100	95-100	70-90	30-50	<25	NP-5
	11-35	Fine sand, loamy very fine sand, fine sandy loam.	SM, SP-SM, SP	A-2, A-3	0-5	100	95-100	60-90	3-25	<30	NP-5
	35-60	Silty clay loam, loam, clay loam.	CL	A-6, A-7	0-5	100	95-100	85-100	80-95	30-45	13-26
145B2------------ Saybrook	0-7	Silt loam--------	CL, CL-ML	A-6, A-4	0	100	100	95-100	90-100	25-40	5-15
	7-24	Silty clay loam, silt loam.	CL, CH	A-7, A-6	0	95-100	95-100	90-100	85-100	35-55	15-30
	24-60	Loam, silt loam, clay loam.	CL	A-6, A-4	0	95-100	85-100	80-95	60-85	20-40	8-25
146A, 146B------- Elliott	0-14	Loam-------------	CL	A-6, A-4	0	95-100	95-100	95-100	75-100	30-40	8-18
	14-38	Silty clay, silty clay loam, clay.	CH, CL	A-6, A-7	0-5	95-100	90-100	90-100	70-100	30-52	11-26
	38-60	Silty clay loam, clay loam, silt loam.	CL	A-6, A-7	0-5	90-100	85-100	80-100	70-95	28-45	11-24
146B2------------ Elliott	0-6	Silty clay loam	CL, ML	A-6, A-7	0	95-100	95-100	95-100	85-100	30-50	11-20
	6-38	Silty clay, silty clay loam, clay.	CH, CL	A-6, A-7	0-5	95-100	90-100	90-100	70-100	30-52	11-26
	38-60	Silty clay loam, clay loam, silt loam.	CL	A-6, A-7	0-5	90-100	85-100	80-100	70-95	28-45	11-24
147A, 147B2------ Clarence	0-11	Silty clay loam	CL	A-6, A-7	0	95-100	95-100	90-100	85-100	30-45	15-25
	11-39	Silty clay, clay	CH	A-7	0-5	95-100	95-100	90-100	85-100	50-65	25-40
	39-60	Silty clay, clay	CL, CH	A-7	0-5	95-100	95-100	90-100	85-100	45-65	25-40
150B------------- Onarga	0-13	Fine sandy loam	SC, SM, SM-SC	A-4, A-6, A-2	0	100	100	75-95	25-50	<28	NP-12
	13-29	Loamy fine sand, sandy clay loam, fine sandy loam.	SC, CL, SM-SC, CL-ML	A-4, A-6, A-2-4, A-2-6	0	95-100	95-100	75-95	30-60	19-32	5-14
	29-60	Stratified sand to sandy loam.	SM, SP-SM, SM-SC	A-2, A-4	0	85-100	80-100	70-95	12-50	<20	NP-6
151-------------- Ridgeville	0-25	Fine sandy loam	SC, SM, SM-SC	A-2, A-4, A-6	0	100	100	90-100	18-50	10-29	NP-12
	25-40	Very fine sandy loam, sandy clay loam, loamy fine sand.	SM-SC, SC, CL, CL-ML	A-4, A-6	0	95-100	95-100	75-95	36-60	20-34	5-14
	40-60	Loamy sand, sandy loam, fine sand.	SM, SM-SC, SC, SP-SM	A-2, A-4	0	90-100	90-100	70-98	12-50	<20	NP-8
153-------------- Pella	0-13	Clay loam--------	CL	A-7	0	100	95-100	90-100	85-95	40-50	15-25
	13-31	Silty clay loam, silty clay, clay loam.	CL	A-6, A-7	0	100	95-100	90-100	85-95	30-50	15-30
	31-38	Stratified silty clay loam to sandy loam.	CL	A-6, A-7	0-5	95-100	90-100	85-95	60-90	25-45	10-25
	38-60	Stratified sandy loam to silty clay loam.	SM-SC, SC, CL, CL-ML	A-2, A-4, A-6	0-5	90-100	80-100	50-100	30-85	20-35	7-20
178-------------- Ruark	0-28	Fine sandy loam	SM, SM-SC, ML, CL-ML	A-4	0	100	100	90-100	40-60	<25	NP-7
	28-43	Fine sandy loam, clay loam, sandy clay loam.	CL-ML, CL	A-6, A-4	0	100	100	95-100	55-70	25-40	5-15
	43-60	Sandy loam, fine sandy loam.	SM, SM-SC, ML, CL-ML	A-4	0	100	90-100	90-100	40-75	<25	NP-7

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
184--------------- Roby	0-8	Loamy fine sand	SM	A-2	0	95-100	95-100	85-95	20-35	<20	NP
	8-11	Loamy fine sand, fine sand, fine sandy loam.	SM, SM-SC	A-4, A-2	0	90-100	90-100	65-90	20-50	<20	NP-7
	11-25	Fine sandy loam, sandy loam, loam.	SM, ML	A-4, A-2	0	90-100	90-100	85-95	30-75	20-34	NP-7
	25-60	Stratified gravelly sand to loam.	SM, SM-SC, SP-SM, ML	A-4, A-2	0	80-100	75-90	50-90	10-65	<20	NP-7
189A-------------- Martinton	0-17	Silty clay loam	ML	A-6, A-7	0	95-100	95-100	90-100	75-95	34-49	10-19
	17-42	Silty clay loam, silty clay.	CL	A-7	0	95-100	95-100	90-100	70-95	35-50	20-30
	42-60	Stratified sandy loam to silty clay.	CL, SC	A-4, A-6, A-7	0	90-100	80-100	75-100	35-90	25-45	10-25
189B-------------- Martinton	0-14	Silt loam--------	ML	A-6, A-7	0	95-100	95-100	90-100	75-95	34-49	10-19
	14-50	Silty clay loam, silty clay.	CL	A-7	0	95-100	95-100	90-100	70-95	35-50	20-30
	50-60	Stratified sandy loam to silty clay.	CL, SC	A-4, A-6, A-7	0	90-100	80-100	75-100	35-90	25-45	10-25
189B2------------- Martinton	0-6	Silty clay loam	ML	A-6, A-7	0	95-100	95-100	90-100	75-95	34-49	10-19
	6-42	Silty clay loam, silty clay.	CL	A-7	0	95-100	95-100	90-100	70-95	35-50	20-30
	42-60	Stratified sandy loam to silty clay.	CL, SC	A-4, A-6, A-7	0	90-100	80-100	75-100	35-90	25-45	10-25
192A-------------- Del Rey	0-9	Silt loam--------	CL	A-6, A-4, A-7	0	95-100	95-100	90-100	70-95	25-45	10-25
	9-41	Silty clay loam, silty clay.	CH, CL	A-7	0	95-100	95-100	90-100	80-95	40-55	20-30
	41-60	Silt loam, silty clay loam.	CL	A-6, A-7	0	95-100	95-100	90-100	70-95	30-45	10-25
192B2------------- Del Rey	0-8	Silty clay loam	CL	A-6, A-4, A-7	0	95-100	95-100	90-100	70-95	25-45	10-25
	8-19	Silty clay loam, silty clay.	CH, CL	A-7	0	95-100	95-100	90-100	80-95	40-55	20-30
	19-60	Silt loam, silty clay loam.	CL	A-6, A-7	0	95-100	95-100	90-100	70-95	30-45	10-25
201--------------- Gilford	0-21	Very fine sandy loam.	SM, SC, SM-SC	A-4	0	95-100	90-100	65-80	35-45	<25	2-10
	21-37	Sandy loam, very fine sandy loam.	SM, SC, SM-SC	A-2-4	0	90-100	90-100	55-70	20-35	15-30	NP-8
	37-60	Loamy fine sand, fine sand.	SM, SP, SP-SM	A-3, A-1-b, A-2-4	0	90-100	85-100	18-60	3-20	---	NP
223B-------------- Varna	0-10	Loam-------------	CL	A-6, A-4	0-5	95-100	95-100	95-100	85-95	25-40	8-20
	10-31	Silty clay, silty clay loam, clay.	CL, CH	A-7, A-6	0-10	95-100	85-100	85-98	80-98	35-56	15-29
	31-60	Silty clay loam, clay loam.	CL	A-7, A-6	0-10	95-100	85-100	85-98	80-95	30-45	13-26
228B-------------- Nappanee	0-8	Silt loam--------	ML, CL	A-4, A-6	0-5	95-100	95-100	85-100	55-90	25-40	3-15
	8-32	Silty clay, clay	CH	A-7	0-5	95-100	95-100	85-100	70-95	50-70	25-45
	32-60	Silty clay, clay, clay loam.	CL, CH	A-7	0-5	95-100	95-100	85-100	70-95	40-60	20-35

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
229---------------- Monee	0-8	Silty clay loam	CL, CH	A-6, A-7	0	100	100	95-100	85-95	35-55	15-30
	8-14	Silty clay loam, silt loam, loam.	CL	A-6	0	100	95-100	80-100	65-95	30-40	10-20
	14-20	Silty clay loam, silt loam, clay loam.	CL, CH	A-6, A-7	0	100	95-100	80-100	65-95	35-55	15-30
	20-56	Silty clay, clay	CH	A-7	0-5	95-100	95-100	90-100	80-95	50-65	25-40
	56-60	Silty clay loam, silty clay, clay.	CL, CH	A-7	0-5	95-100	90-100	90-100	80-95	45-65	20-40
230---------------- Rowe	0-14	Silty clay loam	CL, CH	A-6, A-7	0	100	95-100	90-100	85-95	35-60	15-35
	14-48	Silty clay, clay	CH	A-7	0-5	95-100	95-100	90-100	75-95	50-70	30-45
	48-63	Silty clay, clay	CL, CH	A-7	0-5	95-100	90-100	90-100	75-95	45-60	20-35
232---------------- Ashkum	0-12	Silty clay loam	CL, CH	A-7	0	100	95-100	95-100	75-100	40-60	20-35
	12-30	Silty clay loam, silty clay.	CL, CH	A-7	0	100	90-100	85-100	75-100	45-65	20-35
	30-60	Silty clay loam, silty clay.	CL	A-7, A-6	0-5	95-100	85-100	80-100	75-95	35-50	15-30
235---------------- Bryce	0-13	Silty clay--------	CH, CL	A-7	0	100	100	95-100	85-95	45-60	20-30
	13-45	Silty clay, clay	CH	A-7	0-5	95-100	95-100	95-100	75-95	50-60	25-35
	45-60	Silty clay, silty clay loam, clay.	CH, CL	A-7	0-5	95-100	90-100	90-100	75-95	40-65	20-40
238---------------- Rantoul	0-31	Silty clay--------	CH, CL	A-7	0	95-100	95-100	90-100	90-100	40-60	18-30
	31-60	Silty clay, clay	CH, CL, MH, ML	A-7	0	95-100	90-100	90-100	85-100	45-70	20-35
241C, 241D-------- Chatsworth	0-2	Silty clay--------	CH	A-7	0	100	100	95-100	90-100	50-65	25-35
	2-22	Silty clay, clay, silty clay loam.	CH, CL	A-7	0	100	95-100	95-100	90-100	45-75	20-45
	22-60	Silty clay, clay, silty clay loam.	CL, CH	A-7	0	100	95-100	90-100	85-95	45-65	20-35
284---------------- Tice	0-12	Silt loam---------	CL	A-6, A-7	0	100	100	90-100	80-95	30-45	10-20
	12-60	Silty clay loam	CL, CH	A-7	0	100	100	95-100	85-95	40-55	15-30
293---------------- Andres	0-11	Loam--------------	CL, OL	A-7, A-6	0	95-100	95-100	90-99	80-94	35-50	13-21
	11-39	Silty clay loam, clay loam, sandy clay loam.	CL	A-7	0-5	95-100	95-100	95-100	80-99	40-50	16-26
	39-60	Silty clay loam, silt loam.	CL	A-6, A-7	0-5	95-100	95-100	85-100	70-95	28-48	11-26
294B--------------- Symerton	0-19	Silt loam---------	CL	A-7, A-6	0	100	100	95-100	90-100	30-45	10-20
	19-35	Gravelly clay loam, gravelly loam, clay loam.	CL, CH	A-7, A-6	0-10	95-100	75-95	75-85	60-90	35-55	15-30
	35-60	Silt loam, silty clay loam, clay loam.	CL	A-7, A-6	0-5	95-100	90-100	75-85	80-95	25-45	10-25
295A--------------- Mokena	0-14	Loam--------------	CL	A-6, A-7	0	95-100	95-100	85-100	75-90	30-45	10-15
	14-33	Clay loam, silty clay loam, sandy loam.	CL, SC	A-7, A-6	0	95-100	95-100	70-90	45-85	35-50	10-25
	33-60	Silty clay, clay	CH, CL	A-7	0-5	95-100	90-100	85-100	75-95	40-55	20-31
306A--------------- Allison	0-20	Silty clay loam	CL, ML, CH	A-6, A-7	0	100	100	95-100	70-100	35-55	10-30
	20-42	Silty clay loam, silt loam.	CL, ML	A-6, A-7	0	100	100	90-100	70-95	35-50	10-25
	42-60	Silty clay loam, silt loam, clay loam.	ML, CL, CH	A-6, A-7	0	100	100	90-100	60-95	35-55	10-30
319---------------- Aurelius	0-14	Sapric material	Pt	A-8	0	---	---	---	---	---	---
	14-20	Coprogenous earth	OL	A-8	0	---	---	---	---	---	---
	20-38	Marl--------------	---	---	0	100	95-100	80-90	60-80	---	---
	38-60	Stratified sand to clay loam.	SM, ML, SC, CL	A-2, A-4	0	90-100	90-100	70-90	70-80	<20	NP-10

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
330------------- Peotone	0-12	Silty clay loam	CH, CL	A-7	0	100	95-100	95-100	80-100	40-65	15-35
	12-34	Silty clay loam, silty clay.	CH, CL	A-7	0-5	100	95-100	90-100	85-100	41-70	17-39
	34-60	Silty clay loam, silt loam, silty clay.	CL, CH, ML, MH	A-7, A-6	0-5	95-100	95-100	90-100	75-98	30-60	14-29
375B------------ Rutland	0-13	Silty clay loam	CL	A-6, A-4	0	100	100	95-100	90-100	30-40	8-15
	13-50	Silty clay loam, silty clay, silt loam.	CL, CH	A-7, A-6	0	100	100	95-100	95-100	35-55	15-35
	50-60	Silty clay, clay	CH, CL	A-7	0	100	100	95-100	85-100	40-60	20-35
398------------- Wea	0-14	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-90	25-35	5-15
	14-26	Silty clay loam, clay loam, silt loam.	CL	A-6, A-7	0	95-100	90-95	85-95	65-90	35-50	15-30
	26-41	Gravelly loam----	CL, SM-SC, SC, CL-ML	A-4, A-6	0-5	70-85	65-85	60-80	35-65	15-30	5-15
	41-60	Stratified sand to gravelly sand.	SP, SP-SM, GP, GP-GM	A-1	1-5	30-70	20-55	5-20	0-10	---	NP
405------------- Zook	0-18	Silty clay-------	CH	A-7	0	100	100	95-100	95-100	60-85	35-55
	18-60	Silty clay, silty clay loam.	CH	A-7	0	100	100	95-100	95-100	60-85	35-55
440B------------ Jasper	0-11	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-90	25-35	5-15
	11-41	Sandy clay loam, clay loam, loam.	SC, CL	A-6	0	100	100	80-95	45-85	20-35	10-20
	41-60	Stratified silt to sand.	SC, CL-ML, CL, SM-SC	A-4	0	100	100	75-90	35-85	<30	5-10
443B------------ Barrington	0-14	Silt loam--------	CL	A-4, A-6	0	100	95-100	90-100	80-95	30-40	8-18
	14-26	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	80-95	35-50	11-25
	26-60	Stratified fine sandy loam to silty clay loam.	CL, SM-SC, SC, CL-ML	A-4, A-6	0	95-100	80-100	75-100	36-90	15-30	5-20
484------------- Harco	0-13	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	100	100	95-100	90-100	20-35	2-13
	13-40	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	100	95-100	90-100	35-50	14-27
	40-60	Silt loam, silty clay loam.	CL, ML, CL-ML	A-4, A-6	0	100	95-100	95-100	90-100	20-35	2-13
490------------- Odell	0-12	Silt loam--------	ML, CL	A-4, A-6	0	100	100	90-100	70-95	30-40	8-14
	12-35	Clay loam, loam, silty clay loam.	CL	A-6, A-7	0	90-100	90-95	80-90	65-75	35-50	17-31
	35-60	Loam, clay loam	CL, ML	A-4, A-6	0-3	85-95	80-90	75-85	50-65	25-40	2-16
495B------------ Corwin	0-11	Loam------------	CL, CL-ML	A-4, A-6	0	95-100	95-100	80-100	50-90	22-34	6-15
	11-30	Clay loam--------	CL	A-6, A-7	0	90-100	90-95	80-90	65-75	35-50	17-31
	30-60	Loam------------	CL, ML	A-4, A-6	0-3	85-95	80-90	75-85	50-65	25-40	2-16
495C3----------- Corwin	0-7	Clay loam--------	CL	A-6	0	90-100	90-95	80-90	65-75	30-40	10-20
	7-26	Clay loam--------	CL	A-6, A-7	0	90-100	90-95	80-90	65-75	35-50	17-31
	26-60	Loam------------	CL, ML	A-4, A-6	0-3	85-95	80-90	75-85	50-65	25-40	2-16
501------------- Morocco	0-4	Fine sand--------	SM, SM-SC	A-2-4	0	100	100	65-85	20-35	<20	NP-5
	4-60	Fine sand, sand	SM, SP-SM	A-3, A-2-4	0	100	80-100	50-85	5-25	---	NP
513------------- Granby	0-17	Fine sandy loam	SM	A-2	0	100	100	60-70	20-35	---	NP
	17-60	Sand, fine sand, loamy fine sand.	SP, SP-SM, SM	A-3, A-2	0	100	95-100	50-75	0-20	---	NP
560E------------ St. Clair	0-8	Loam------------	ML, CL, CL-ML	A-4, A-6	0-5	95-100	90-100	70-90	50-90	20-40	3-15
	8-24	Clay, silty clay	CH, MH	A-7	0-5	95-100	90-100	75-100	65-95	50-70	21-41
	24-60	Clay, silty clay	CH	A-7	0-5	95-100	90-100	70-100	60-95	50-60	29-34

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
570B------------- Martinsville	0-13	Loam-------------	CL, CL-ML	A-4, A-6	0	100	90-100	80-100	60-90	22-33	4-12
	13-56	Fine sandy loam, sandy clay loam, loam.	SM, ML	A-2-4, A-4	0	100	90-100	60-80	30-60	30-40	2-8
	56-60	Stratified sand to sandy clay loam.	CL, SC, CL-ML, SM-SC	A-4	0	95-100	85-100	80-95	40-60	<25	4-9
570C2, 570D2----- Martinsville	0-11	Loam-------------	CL, CL-ML	A-4, A-6	0	100	90-100	80-100	60-90	22-33	4-12
	11-55	Clay loam, silty clay loam, sandy clay loam.	CL, SC	A-4, A-6	0	100	90-100	65-90	40-90	20-35	8-20
	55-60	Stratified sand to silt loam.	CL, SC, CL-ML, SM-SC	A-4	0	95-100	85-100	80-95	40-60	<25	4-9
594-------------- Reddick	0-11	Clay loam--------	CL	A-6, A-7	0	95-100	85-95	85-95	75-90	30-50	10-25
	11-40	Clay loam, silty clay loam.	CL	A-6, A-7	0-5	95-100	80-90	80-90	65-90	30-50	10-25
	40-60	Silty clay, clay loam, clay.	CL, CH	A-6, A-7	0-10	95-100	90-100	85-95	80-95	35-55	15-30
741B, 741C------- Oakville	0-5	Fine sand--------	SM, SP, SP-SM	A-2, A-3	0	100	100	50-85	0-35	---	NP
	5-60	Fine sand, sand, loamy fine sand.	SM, SP, SP-SM	A-2, A-3	0	100	95-100	65-95	0-25	---	NP
776-------------- Comfrey	0-11	Loam-------------	ML, OL, CL	A-6, A-4	0	100	100	85-100	55-90	30-40	5-15
	11-25	Clay loam, loam	OL, OH, MH, ML	A-7	0	100	100	85-100	65-85	45-60	12-25
	25-60	Clay loam, loam	CL	A-7, A-6	0	100	100	80-100	60-85	35-50	12-25
779B, 779C------- Chelsea	0-8	Fine sand--------	SM, SP-SM	A-2-4	0	100	100	65-80	10-35	---	NP
	8-60	Fine sand, sand, loamy fine sand.	SP, SM, SP-SM	A-3, A-2-4	0	100	100	65-80	3-15	---	NP
802, 805. Orthents											

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cm3	In/hr	In/in	pH				Pct
27B---------------Miami	0-11	11-22	1.30-1.45	0.6-2.0	0.20-0.24	5.6-7.3	Low-----------	0.37	5	.5-3
	11-28	25-35	1.45-1.65	0.6-2.0	0.15-0.20	5.6-7.3	Moderate-----	0.37		
	28-60	15-30	1.55-1.90	0.2-0.6	0.05-0.19	6.6-8.4	Moderate-----	0.37		
49---------------Watseka	0-14	8-13	1.35-1.55	6.0-20	0.10-0.12	6.1-7.3	Low-----------	0.17	5	1-3
	14-60	1-10	1.70-2.00	6.0-20	0.05-0.10	5.1-7.3	Low-----------	0.17		
59---------------Lisbon	0-14	20-25	1.10-1.30	0.6-2.0	0.22-0.24	5.6-7.3	Low-----------	0.28	4	3-5
	14-39	25-35	1.15-1.35	0.6-2.0	0.18-0.22	6.1-7.8	Moderate-----	0.43		
	39-60	20-30	1.45-1.65	0.2-0.6	0.07-0.11	6.1-8.4	Low-----------	0.43		
69---------------Milford	0-18	35-42	1.30-1.50	0.6-2.0	0.12-0.23	5.6-7.3	High----------	0.28	5	5-6
	18-50	35-42	1.40-1.60	0.2-0.6	0.18-0.20	5.6-7.8	Moderate-----	0.43		
	50-60	20-30	1.50-1.70	0.2-0.6	0.20-0.22	6.6-8.4	Moderate-----	0.43		
88B---------------Sparta	0-21	1-5	1.30-1.50	6.0-20	0.06-0.09	5.1-7.3	Low-----------	0.17	5	1-2
	21-44	1-8	1.40-1.60	6.0-20	0.05-0.11	5.1-6.5	Low-----------	0.17		
	44-60	0-5	1.50-1.70	6.0-20	0.04-0.07	5.1-6.0	Low-----------	0.17		
91A, 91B----------Swygert	0-12	27-40	1.25-1.50	0.2-0.6	0.18-0.22	5.6-7.3	Moderate-----	0.43	3	3-5
	12-18	30-45	1.30-1.55	0.2-0.6	0.08-0.16	5.6-7.3	High----------	0.32		
	18-31	45-50	1.40-1.70	0.06-0.2	0.05-0.12	5.6-8.4	High----------	0.32		
	31-60	38-60	1.40-1.75	<0.06	0.03-0.05	7.4-8.4	High----------	0.32		
102---------------La Hogue	0-12	10-27	1.40-1.60	0.6-2.0	0.20-0.24	6.1-7.3	Low-----------	0.28	5	3-4
	12-39	18-35	1.50-1.70	0.6-2.0	0.12-0.20	5.1-7.3	Moderate-----	0.28		
	39-60	5-20	1.60-1.80	0.6-6.0	0.05-0.22	5.6-7.8	Low-----------	0.20		
103---------------Houghton	0-60	---	0.15-0.45	0.2-6.0	0.35-0.45	5.1-7.8	--------------	----	---	>70
107---------------Sawmill	0-30	27-35	1.20-1.40	0.6-2.0	0.21-0.23	6.1-7.8	Moderate-----	0.28	5	4-5
	30-60	25-35	1.30-1.45	0.6-2.0	0.17-0.20	6.1-7.8	Moderate-----	0.28		
125---------------Selma	0-12	20-27	1.40-1.60	0.6-2.0	0.20-0.24	6.1-7.8	Low-----------	0.28	5	4-6
	12-44	18-30	1.40-1.60	0.6-2.0	0.15-0.19	6.1-8.4	Moderate-----	0.28		
	44-60	7-18	1.60-1.90	2.0-6.0	0.07-0.19	6.6-8.4	Low-----------	0.28		
131B---------------Alvin	0-8	10-15	1.45-1.65	2.0-6.0	0.14-0.20	5.1-6.5	Low-----------	0.24	5	.5-1
	8-45	15-18	1.45-1.65	0.6-6.0	0.12-0.20	4.5-6.0	Low-----------	0.24		
	45-60	3-10	1.55-1.75	2.0-6.0	0.05-0.13	5.1-7.8	Low-----------	0.24		
141A---------------Wesley	0-11	8-15	1.25-1.45	2.0-6.0	0.15-0.18	5.6-7.3	Low-----------	0.24	3	3-4
	11-35	3-15	1.70-2.00	2.0-20	0.06-0.14	5.6-7.3	Low-----------	0.20		
	35-60	23-33	1.40-1.60	0.2-0.6	0.09-0.12	6.6-8.4	Moderate-----	0.37		
145B2--------------Saybrook	0-7	20-26	1.10-1.30	0.6-2.0	0.22-0.24	5.6-7.3	Low-----------	0.32	5	3-4
	7-24	27-35	1.20-1.40	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.43		
	24-60	24-35	1.50-1.70	0.6-2.0	0.15-0.21	5.6-8.4	Low-----------	0.43		
146A, 146B--------Elliott	0-14	24-27	1.10-1.30	0.6-2.0	0.22-0.24	5.6-7.3	Low-----------	0.28	4	4-5
	14-38	35-50	1.30-1.60	0.2-0.6	0.11-0.20	5.6-7.8	Moderate-----	0.28		
	38-60	7-40	1.60-1.75	0.06-0.6	0.14-0.20	7.4-8.4	Moderate-----	0.28		
146B2-------------Elliott	0-6	27-35	1.15-1.35	0.6-2.0	0.21-0.23	5.6-7.3	Moderate-----	0.28	4	3-4
	6-38	35-50	1.30-1.60	0.2-0.6	0.11-0.20	5.6-7.8	Moderate-----	0.28		
	38-60	7-40	1.60-1.75	0.06-0.6	0.14-0.20	7.4-8.4	Moderate-----	0.28		
147A, 147B2-------Clarence	0-11	25-40	1.45-1.65	0.2-0.6	0.21-0.24	5.6-7.3	Moderate-----	0.28	3	3-4
	11-39	50-60	1.60-1.75	<0.06	0.07-0.09	5.6-8.4	Moderate-----	0.28		
	39-60	40-60	1.70-1.85	<0.06	0.05-0.07	7.4-8.4	Moderate-----	0.28		
150B--------------Onarga	0-13	8-15	1.15-1.45	0.6-6.0	0.13-0.22	5.6-7.8	Low-----------	0.20	4	2-4
	13-29	15-18	1.45-1.70	0.6-6.0	0.15-0.19	4.5-7.3	Low-----------	0.20		
	29-60	2-10	1.65-1.90	6.0-20	0.05-0.13	5.1-7.3	Low-----------	0.15		

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cm^3	In/hr	In/in	pH				Pct
151	0-25	10-15	1.15-1.45	0.6-6.0	0.15-0.22	5.6-6.5	Low	0.20	4	2-4
Ridgeville	25-40	14-18	1.45-1.70	0.6-6.0	0.15-0.19	5.6-6.5	Low	0.20		
	40-60	3-10	1.55-1.90	6.0-20	0.05-0.13	6.6-7.8	Low	0.20		
153	0-13	27-35	1.10-1.30	0.6-2.0	0.21-0.23	6.1-7.8	Moderate	0.28	5	5-6
Pella	13-31	27-35	1.20-1.45	0.6-2.0	0.21-0.24	6.6-7.8	Moderate	0.28		
	31-38	15-30	1.35-1.60	0.6-2.0	0.15-0.20	7.4-8.4	Moderate	0.28		
	38-60	15-30	1.40-1.70	0.6-2.0	0.10-0.22	7.4-8.4	Low	0.28		
178	0-28	15-20	1.40-1.60	0.6-2.0	0.16-0.18	4.5-6.0	Low	0.24	4	1-2
Ruark	28-43	20-35	1.40-1.60	0.2-0.6	0.15-0.19	4.5-6.0	Low	0.24		
	43-60	10-20	1.45-1.65	0.6-2.0	0.11-0.16	5.6-7.8	Low	0.24		
184	0-8	3-10	1.20-1.50	2.0-6.0	0.10-0.13	4.5-7.3	Low	0.17	4	1-2
Roby	8-11	3-15	1.25-1.55	0.6-2.0	0.09-0.20	4.5-7.3	Low	0.28		
	11-25	10-18	1.40-1.70	0.6-2.0	0.12-0.19	5.6-7.8	Low	0.28		
	25-60	3-15	1.50-1.85	2.0-6.0	0.04-0.17	5.6-7.8	Low	0.10		
189A	0-17	20-32	1.20-1.40	0.6-2.0	0.22-0.24	5.6-7.3	Low	0.32	4	4-5
Martinton	17-42	35-45	1.25-1.45	0.2-0.6	0.11-0.20	5.6-7.8	Moderate	0.43		
	42-60	15-42	1.40-1.60	0.2-0.6	0.11-0.22	7.4-8.4	Moderate	0.43		
189B	0-14	20-32	1.20-1.40	0.6-2.0	0.22-0.24	5.6-7.3	Low	0.32	4	4-5
Martinton	14-50	35-45	1.25-1.45	0.2-0.6	0.11-0.20	5.6-7.8	Moderate	0.43		
	50-60	15-42	1.40-1.60	0.2-0.6	0.11-0.22	7.4-8.4	Moderate	0.43		
189B2	0-6	20-32	1.20-1.40	0.6-2.0	0.22-0.24	5.6-7.3	Low	0.32	4	3-4
Martinton	6-42	35-45	1.25-1.45	0.2-0.6	0.11-0.20	5.6-7.8	Moderate	0.43		
	42-60	15-42	1.40-1.60	0.2-0.6	0.11-0.22	7.4-8.4	Moderate	0.43		
192A	0-9	20-30	1.30-1.50	0.6-2.0	0.22-0.24	5.1-7.3	Low	0.43	3	2-3
Del Rey	9-41	35-45	1.40-1.65	0.06-0.2	0.12-0.20	5.1-8.4	Moderate	0.43		
	41-60	25-35	1.50-1.70	0.06-0.2	0.09-0.11	7.9-8.4	Moderate	0.43		
192B2	0-8	20-30	1.30-1.50	0.6-2.0	0.22-0.24	5.1-7.3	Low	0.43	3	.5-1
Del Rey	8-19	35-45	1.40-1.65	0.06-0.2	0.12-0.20	5.1-8.4	Moderate	0.43		
	19-60	25-35	1.50-1.70	0.06-0.2	0.09-0.11	7.9-8.4	Moderate	0.43		
201	0-21	10-20	1.50-1.70	2.0-6.0	0.16-0.18	5.6-7.3	Low	0.20	4	4-5
Gilford	21-37	8-17	1.60-1.80	2.0-6.0	0.12-0.14	5.6-7.3	Low	0.20		
	37-60	3-12	1.70-1.90	6.0-20	0.05-0.08	6.6-8.4	Low	0.15		
223B	0-10	20-30	1.10-1.30	0.6-2.0	0.22-0.24	6.1-7.3	Low	0.32	4	3-4
Varna	10-31	35-48	1.30-1.60	0.06-0.6	0.09-0.19	5.6-7.3	Moderate	0.32		
	31-60	27-40	1.50-1.70	0.2-0.6	0.14-0.20	6.6-8.4	Low	0.32		
228B	0-8	20-27	1.30-1.50	0.6-2.0	0.20-0.24	5.1-7.3	Low	0.43	3	2-3
Nappanee	8-32	45-60	1.40-1.80	<0.06	0.08-0.14	5.1-7.8	Moderate	0.32		
	32-60	35-50	1.60-1.85	<0.06	0.06-0.12	7.4-8.4	Moderate	0.32		
229	0-8	27-40	1.25-1.50	0.6-2.0	0.21-0.23	5.6-7.3	Moderate	0.37	3	2-4
Monee	8-14	20-30	1.40-1.60	0.2-0.6	0.17-0.22	5.1-6.5	Moderate	0.37		
	14-20	30-40	1.35-1.60	0.2-0.6	0.18-0.21	5.6-6.5	Moderate	0.37		
	20-56	45-60	1.45-1.70	<0.06	0.09-0.13	5.6-7.8	High	0.37		
	56-60	38-60	1.45-1.75	<0.06	0.08-0.16	6.6-8.4	High	0.37		
230	0-14	30-50	1.25-1.45	0.06-0.2	0.14-0.20	6.1-8.4	Moderate	0.28	5	4-5
Rowe	14-48	48-60	1.40-1.70	<0.06	0.09-0.13	6.1-8.4	High	0.28		
	48-63	40-50	1.40-1.75	<0.06	0.08-0.12	7.4-8.4	Moderate	0.28		
232	0-12	35-45	1.20-1.40	0.2-0.6	0.12-0.23	5.6-7.8	High	0.28	5	5-7
Ashkum	12-30	35-45	1.30-1.60	0.2-0.6	0.11-0.20	6.1-7.8	High	0.28		
	30-60	30-40	1.60-1.75	0.2-0.6	0.18-0.20	6.1-8.4	Moderate	0.28		
235	0-13	35-48	1.30-1.50	0.2-0.6	0.12-0.21	5.6-7.8	High	0.28	3	5-7
Bryce	13-45	42-52	1.35-1.60	0.06-0.2	0.09-0.13	6.6-8.4	High	0.28		
	45-60	38-60	1.60-1.75	<0.2	0.03-0.05	7.4-8.4	High	0.28		
238	0-31	32-45	1.35-1.55	0.2-0.6	0.12-0.23	6.1-7.3	High	0.28	3	5-7
Rantoul	31-60	42-60	1.45-1.65	<0.06	0.09-0.13	6.1-8.4	High	0.28		

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cm^3	In/hr	In/in	pH				Pct
241C, 241D-------	0-2	40-60	1.30-1.50	<0.06	0.06-0.07	5.6-7.8	Moderate-----	0.32	2	.5-1
Chatsworth	2-22	35-60	1.50-1.70	<0.06	0.05-0.07	6.1-8.4	Moderate-----	0.32		
	22-60	35-50	1.60-1.85	<0.06	0.04-0.06	7.4-8.4	Moderate-----	0.32		
284--------------	0-12	22-35	1.25-1.45	0.6-2.0	0.21-0.24	6.1-7.8	Moderate-----	0.32	5	2-3
Tice	12-60	27-35	1.30-1.50	0.6-2.0	0.18-0.20	5.6-7.8	Moderate-----	0.32		
293--------------	0-11	21-29	1.20-1.40	0.6-2.0	0.21-0.24	5.6-7.3	Low----------	0.28	5	4-5
Andres	11-39	27-35	1.35-1.60	0.6-2.0	0.16-0.20	5.6-7.8	Moderate-----	0.28		
	39-60	22-32	1.45-1.70	0.2-0.6	0.18-0.20	7.4-8.4	Moderate-----	0.37		
294B-------------	0-19	20-30	1.15-1.30	0.6-2.0	0.21-0.24	5.6-7.3	Low----------	0.32	4	3-4
Symerton	19-35	27-35	1.35-1.60	0.6-2.0	0.12-0.18	5.6-7.8	Moderate-----	0.32		
	35-60	20-35	1.45-1.70	0.2-0.6	0.09-0.10	7.4-8.4	Moderate-----	0.43		
295A-------------	0-14	20-29	1.15-1.35	0.6-2.0	0.20-0.24	6.1-8.4	Low----------	0.28	4	4-5
Mokena	14-33	23-35	1.35-1.55	0.2-0.6	0.15-0.20	6.1-8.4	Moderate-----	0.28		
	33-60	40-45	1.40-1.80	0.06-0.2	0.08-0.12	6.6-8.4	Moderate-----	0.28		
306A-------------	0-20	25-40	1.35-1.55	0.6-2.0	0.21-0.24	6.1-7.8	Moderate-----	0.28	5	2-4
Allison	20-42	25-35	1.30-1.50	0.6-2.0	0.18-0.21	6.1-7.8	Moderate-----	0.28		
	42-60	25-40	1.35-1.60	0.6-2.0	0.15-0.21	6.1-7.8	Moderate-----	0.28		
319--------------	0-14	---	0.32-0.52	0.2-6.0	0.35-0.45	6.6-8.4	-------------	----	---	40-60
Aurelius	14-20	---	---	---		6.6-8.4	-------------	----	---	
	20-38	---	---	---	---	7.4-8.4	-------------	----		
	38-60	0-35	1.55-1.90	6.0-20	0.18-0.24	7.4-8.4	Low----------	----	---	
330--------------	0-12	33-40	1.20-1.40	0.2-0.6	0.12-0.23	6.1-7.8	High---------	0.28	5	5-7
Peotone	12-34	35-45	1.30-1.60	0.2-0.6	0.11-0.20	6.1-7.8	High---------	0.28		
	34-60	25-42	1.40-1.65	0.2-0.6	0.18-0.20	6.6-8.4	High---------	0.28		
375B-------------	0-13	20-30	1.20-1.40	0.6-2.0	0.22-0.24	5.6-7.3	Moderate-----	0.28	5	4-5
Rutland	13-50	35-45	1.35-1.55	0.2-0.6	0.18-0.20	5.1-8.4	High---------	0.43		
	50-60	40-50	1.45-1.70	0.06-0.6	0.08-0.12	6.6-8.4	High---------	0.32		
398--------------	0-14	18-27	1.30-1.45	0.6-2.0	0.20-0.24	5.1-7.3	Low----------	0.32	5	2-5
Wea	14-26	20-35	1.40-1.60	0.6-2.0	0.15-0.20	5.1-6.5	Moderate-----	0.43		
	26-41	15-25	1.35-1.50	0.6-2.0	0.10-0.12	6.1-8.4	Low----------	0.24		
	41-60	1-7	1.50-1.75	>20	0.02-0.04	7.4-8.4	Low----------	0.10		
405--------------	0-18	40-44	1.35-1.40	0.06-0.2	0.11-0.13	5.6-7.3	High---------	0.28	5	5-7
Zook	18-60	36-45	1.30-1.45	0.06-0.2	0.11-0.13	5.6-7.8	High---------	0.28		
440B-------------	0-11	10-22	1.30-1.45	0.6-2.0	0.20-0.24	5.1-7.3	Low----------	0.28	5	4-5
Jasper	11-41	20-32	1.40-1.60	0.6-2.0	0.16-0.18	5.1-6.0	Low----------	0.28		
	41-60	5-20	1.50-1.70	0.6-2.0	0.19-0.21	7.4-7.8	Low----------	0.28		
443B-------------	0-14	20-27	1.15-1.30	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.32	5	4-5
Barrington	14-26	27-35	1.20-1.45	0.6-2.0	0.18-0.20	5.6-7.8	Moderate-----	0.43		
	26-60	7-28	1.50-1.70	0.6-2.0	0.07-0.11	6.1-8.4	Low----------	0.43		
484--------------	0-13	20-27	1.20-1.35	0.6-2.0	0.22-0.24	6.1-7.3	Low----------	0.32	5	4-5
Harco	13-40	24-35	1.25-1.45	0.6-2.0	0.18-0.20	6.1-7.3	Moderate-----	0.32		
	40-60	20-27	1.30-1.50	0.6-2.0	0.20-0.22	7.4-8.4	Low----------	0.32		
490--------------	0-12	20-27	1.30-1.50	0.6-2.0	0.21-0.24	5.6-7.3	Low----------	0.28	5	4-5
Odell	12-35	25-35	1.50-1.70	0.2-0.6	0.15-0.19	5.6-7.8	Moderate-----	0.37		
	35-60	18-30	1.50-1.70	0.2-0.6	0.05-0.19	6.6-8.4	Low----------	0.37		
495B-------------	0-11	18-27	1.30-1.45	0.6-2.0	0.21-0.24	5.1-7.3	Low----------	0.28	5	4-5
Corwin	11-30	25-35	1.40-1.60	0.2-0.6	0.15-0.19	5.1-7.8	Moderate-----	0.28		
	30-60	18-30	1.45-1.70	0.2-0.6	0.05-0.19	7.9-8.4	Low----------	0.37		
495C3------------	0-7	27-30	1.40-1.60	0.2-0.6	0.15-0.19	5.1-7.3	Moderate-----	0.28	4	2-4
Corwin	7-26	25-35	1.40-1.60	0.2-0.6	0.15-0.19	5.1-7.8	Moderate-----	0.28		
	26-60	18-30	1.45-1.70	0.2-0.6	0.05-0.19	7.9-8.4	Low----------	0.37		
501--------------	0-4	1-6	1.45-1.65	6.0-20	0.07-0.09	5.1-6.5	Low----------	0.17	5	5-1
Morocco	4-60	1-6	1.50-1.70	6.0-20	0.05-0.07	4.5-6.0	Low----------	0.17		

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm^3	In/hr	In/in	pH				Pct
513--------------	0-17	2-18	1.20-1.60	2.0-6.0	0.16-0.18	5.6-7.3	Low----------	0.17	5	4-6
Granby	17-60	0-14	1.45-1.65	6.0-20	0.05-0.12	5.6-7.8	Low----------	0.17		
560E-------------	0-8	20-27	1.50-1.65	0.6-2.0	0.20-0.24	5.6-7.3	Low----------	0.37	3	1-2
St. Clair	8-24	50-60	1.35-1.70	<0.2	0.10-0.12	5.6-7.8	High---------	0.37		
	24-60	40-55	1.60-1.75	<0.2	0.09-0.11	7.4-8.4	High---------	0.37		
570B-------------	0-13	8-17	1.30-1.45	0.6-2.0	0.20-0.24	5.6-7.3	Low----------	0.37	5	1-2
Martinsville	13-56	10-25	1.40-1.60	0.6-2.0	0.12-0.14	5.6-6.5	Low----------	0.24		
	56-60	3-23	1.50-1.70	0.6-2.0	0.19-0.21	5.6-8.4	Low----------	0.24		
570C2, 570D2-----	0-11	8-17	1.30-1.45	0.6-2.0	0.20-0.24	5.6-7.3	Low----------	0.37	5	1-2
Martinsville	11-55	18-30	1.40-1.60	0.6-2.0	0.17-0.20	5.1-6.0	Moderate-----	0.37		
	55-60	3-23	1.50-1.70	0.6-2.0	0.19-0.21	7.4-8.4	Low----------	0.24		
594--------------	0-11	27-35	1.20-1.40	0.6-2.0	0.17-0.23	6.6-7.8	Moderate-----	0.28	5	5-6
Reddick	11-40	25-35	1.35-1.60	0.6-2.0	0.15-0.20	6.6-7.8	Moderate-----	0.28		
	40-60	25-43	1.50-1.70	<0.2	0.08-0.20	7.4-8.4	Moderate-----	0.28		
741B, 741C-------	0-5	0-10	1.30-1.55	6.0-20	0.07-0.09	5.6-7.3	Low----------	0.15	5	.5-1
Oakville	5-60	0-10	1.30-1.65	6.0-20	0.06-0.10	5.6-7.3	Low----------	0.15		
776--------------	0-11	18-27	1.20-1.40	0.6-2.0	0.20-0.24	6.6-7.8	Low----------	0.28	5	6-10
Comfrey	11-25	18-35	1.20-1.40	0.6-2.0	0.16-0.20	6.6-7.8	Moderate-----	0.28		
	25-60	18-35	1.30-1.50	0.6-2.0	0.15-0.19	6.6-8.4	Moderate-----	0.28		
779B, 779C-------	0-8	8-15	1.50-1.55	6.0-20	0.10-0.15	5.6-7.3	Low----------	0.17	5	.5-1
Chelsea	8-60	5-10	1.55-1.70	6.0-20	0.06-0.08	5.1-6.5	Low----------	0.17		
802, 805.										
Orthents										

TABLE 17.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft					
27B---------------- Miami	B	None---------	---	---	>6.0	---	---	Moderate	Moderate	Moderate.
49----------------- Watseka	B	None---------	---	---	1.0-3.0	Apparent	Feb-May	Moderate	Low-------	High.
59----------------- Lisbon	B	None---------	---	---	1.0-3.0	Apparent	Nov-May	High------	High------	Moderate.
69----------------- Milford	B/D	None---------	---	---	+.5-2.0	Apparent	Mar-Jun	High------	High------	Low.
88B---------------- Sparta	A	None---------	---	---	>6.0	---	---	Low-------	Low-------	Moderate.
91A, 91B----------- Swygert	C	None---------	---	---	2.0-4.0	Perched	Feb-May	High------	High------	Low.
102---------------- La Hogue	B	None---------	---	---	1.0-3.0	Apparent	Feb-Jun	High------	High------	Moderate.
103---------------- Houghton	A/D	None---------	---	---	+1-1.0	Apparent	Sep-Jun	High------	High------	Low.
107---------------- Sawmill	B/D	Frequent-----	Brief------	Mar-Jun	0-2.0	Apparent	Mar-Jun	High------	High------	Low.
125---------------- Selma	B/D	None---------	---	---	+.5-2.0	Apparent	Mar-Jun	High------	High------	Low.
131B--------------- Alvin	B	None---------	---	---	>6.0	---	---	Moderate	Low-------	High.
141A--------------- Wesley	B	None---------	---	---	1.0-3.0	Perched	Mar-Jun	High------	High------	Low.
145B2-------------- Saybrook	B	None---------	---	---	4.0-6.0	Apparent	Mar-Jun	High------	High------	Moderate.
146A, 146B, 146B2- Elliott	C	None---------	---	---	1.0-3.0	Apparent	Mar-May	High------	High------	Moderate.
147A, 147B2-------- Clarence	D	None---------	---	---	1.0-3.0	Perched	Feb-May	Moderate	High------	Low.
150B--------------- Onarga	B	None---------	---	---	>6.0	---	---	Moderate	Low-------	High.
151---------------- Ridgeville	B	None---------	---	---	1.0-3.0	Apparent	Feb-May	High------	Moderate	Moderate.
153---------------- Pella	B/D	None---------	---	---	+.5-2.0	Apparent	Dec-Jun	High------	High------	Low.
178---------------- Ruark	B/D	None---------	---	---	+.5-2.0	Apparent	Mar-Jul	High------	High------	High.
184---------------- Roby	C	None---------	---	---	1.0-3.0	Apparent	Mar-Jun	High------	Moderate	High.
189A, 189B, 189B2- Martinton	C	None---------	---	---	1.0-3.0	Apparent	Feb-May	High------	High------	Moderate.
192A, 192B2-------- Del Rey	C	None---------	---	---	1.0-3.0	Apparent	Jan-May	High------	High------	Low.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft					
201: Gilford	B/D	None	---	---	+.5-1.0	Apparent	Dec-May	High	High	Moderate.
223B: Varna	C	None	---	---	3.0-6.0	Perched	Mar-May	High	Moderate	Moderate.
228B: Nappanee	D	None	---	---	1.0-2.0	Perched	Nov-May	Moderate	High	Low.
229: Monee	D	None	---	---	+.5-1.0	Apparent	Feb-May	Moderate	High	Moderate.
230: Rowe	D	None	---	---	+.5-1.0	Apparent	Mar-Jun	Moderate	High	Low.
232: Ashkum	B/D	None	---	---	+1-2.0	Apparent	Apr-Jun	High	High	Moderate.
235: Bryce	D	None	---	---	+1-1.0	Apparent	Feb-Jun	High	High	Low.
238: Rantoul	D	None	---	---	+.5-2.0	Perched	Mar-Jun	Moderate	High	Low.
241C, 241D: Chatsworth	D	None	---	---	>6.0	---	---	Moderate	High	Low.
284: Tice	B	Frequent	Brief	Mar-Apr	1.0-3.0	Apparent	Mar-Jun	High	High	Low.
293: Andres	B	None	---	---	1.0-3.0	Apparent	Mar-Jun	High	High	Low.
294B: Symerton	B	None	---	---	3.5-6.0	Apparent	Mar-May	Moderate	High	Moderate.
295A: Mokena	C	None	---	---	1.0-3.0	Perched	Mar-Jun	High	High	Moderate.
306A: Allison	B	Frequent	Brief	Jan-Mar	>6.0	---	---	High	High	Low.
319: Aurelius	B/D	None	---	---	+1-1.0	Apparent	Sep-Jun	High	High	Low.
330: Peotone	B/D	None	---	---	+.5-1.0	Apparent	Feb-Jul	High	High	Moderate.
375B: Rutland	C	None	---	---	1.0-3.0	Apparent	Mar-May	High	High	Moderate.
398: Wea	B	None	---	---	>6.0	---	---	Moderate	Moderate	Moderate.
405: Zook	C/D	Frequent	Brief to long.	Feb-Nov	0-2.0	Apparent	Nov-May	High	High	Moderate.
440B: Jasper	B	None	---	---	>6.0	---	---	Moderate	Moderate	High.
443B: Barrington	B	None	---	---	3.0-6.0	Apparent	Apr-Jun	High	Moderate	Moderate.
484: Harco	B	None	---	---	1.0-3.0	Apparent	Feb-Apr	High	High	Low.
490: Odell	B	None	---	---	1.0-3.0	Apparent	Jan-Apr	High	High	Moderate.
495B, 495C3: Corwin	B	None	---	---	3.0-6.0	Perched	Mar-Apr	Moderate	High	Moderate.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft					
501---------------- Morocco	B	None---------	---	---	1.0-2.0	Apparent	Jan-Apr	Moderate	Low-------	High.
513---------------- Granby	A/D	None---------	---	---	+1-1.0	Apparent	Nov-Jun	Moderate	High------	Low.
560E--------------- St. Clair	D	None---------	---	---	2.0-3.0	Perched	Mar-May	Moderate	High------	Moderate.
570B, 570C2, 570D2------------- Martinsville	B	None---------	---	---	>6.0	---	---	Moderate	Moderate	Moderate.
594---------------- Reddick	B/D	None---------	---	---	0-2.0	Apparent	Mar-Jun	High------	High------	Low.
741B, 741C--------- Oakville	A	None---------	---	---	>6.0	---	---	Low-------	Low-------	Moderate.
776---------------- Comfrey	B/D	Frequent----	Brief------	Mar-Jun	0-3.0	Apparent	Apr-Jul	High------	High------	Low.
779B, 779C--------- Chelsea	A	None---------	---	---	>6.0	---	---	Low-------	Low-------	Low.
802, 805. Orthents										

TABLE 18.--CLASSIFICATION OF THE SOILS

[An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series]

Soil name	Family or higher taxonomic class
Allison	Fine-silty, mixed, mesic Cumulic Hapludolls
Alvin	Coarse-loamy, mixed, mesic Typic Hapludalfs
Andres	Fine-loamy, mixed, mesic Aquic Argiudolls
Ashkum	Fine, mixed, mesic Typic Haplaquolls
Aurelius	Fine-silty, carbonatic, mesic Histic Humaquepts
Barrington	Fine-silty, mixed, mesic Typic Argiudolls
Bryce	Fine, mixed, mesic Typic Haplaquolls
Chatsworth	Fine, illitic, mesic Typic Eutrochrepts
Chelsea	Mixed, mesic Alfic Udipsamments
Clarence	Fine, illitic, mesic Aquic Argiudolls
Comfrey	Fine-loamy, mixed, mesic Cumulic Haplaquolls
Corwin	Fine-loamy, mixed, mesic Typic Argiudolls
Del Rey	Fine, illitic, mesic Aeric Ochraqualfs
Elliott	Fine, illitic, mesic Aquic Argiudolls
Gilford	Coarse-loamy, mixed, mesic Typic Haplaquolls
Granby	Sandy, mixed, mesic Typic Haplaquolls
Harco	Fine-silty, mixed, mesic Aquic Argiudolls
Houghton	Euic, mesic Typic Medisaprists
*Jasper	Fine-loamy, mixed, mesic Typic Argiudolls
La Hogue	Fine-loamy, mixed, mesic Aquic Argiudolls
Lisbon	Fine-silty, mixed, mesic Aquic Argiudolls
Martinsville	Fine-loamy, mixed, mesic Typic Hapludalfs
Martinton	Fine, illitic, mesic Aquic Argiudolls
Miami	Fine-loamy, mixed, mesic Typic Hapludalfs
Milford	Fine, mixed, mesic Typic Haplaquolls
Mokena	Fine-loamy, mixed, mesic Aquic Argiudolls
Monee	Fine, illitic, mesic Mollic Ochraqualfs
Morocco	Mixed, mesic Aquic Udipsamments
*Nappanee	Fine, illitic, mesic Aeric Ochraqualfs
Oakville	Mixed, mesic Typic Udipsamments
Odell	Fine-loamy, mixed, mesic Aquic Argiudolls
Onarga	Coarse-loamy, mixed, mesic Typic Argiudolls
Orthents, loamy	Loamy, mixed, nonacid, mesic Udorthents
Orthents, clayey	Clayey, mixed, nonacid, mesic Udorthents
Pella	Fine-silty, mixed, mesic Typic Haplaquolls
Peotone	Fine, montmorillonitic, mesic Cumulic Haplaquolls
Rantoul	Fine, montmorillonitic, mesic Vertic Haplaquolls
Reddick	Fine-loamy, mixed, mesic Typic Haplaquolls
Ridgeville	Coarse-loamy, mixed, mesic Aquic Argiudolls
Roby	Coarse-loamy, mixed, mesic Aquic Hapludalfs
Rowe	Fine, mixed, mesic Typic Argiaquolls
Ruark	Fine-loamy, mixed, mesic Typic Ochraqualfs
Rutland	Fine, montmorillonitic, mesic Aquic Argiudolls
Sawmill	Fine-silty, mixed, mesic Cumulic Haplaquolls
*Saybrook	Fine-silty, mixed, mesic Typic Argiudolls
Selma	Fine-loamy, mixed, mesic Typic Haplaquolls
Sparta	Sandy, mixed, mesic Entic Hapludolls
*St. Clair	Fine, illitic, mesic Typic Hapludalfs
Swygert	Fine, mixed, mesic Aquic Argiudolls
Symerton	Fine-loamy, mixed, mesic Typic Argiudolls
Tice	Fine-silty, mixed, mesic Fluvaquentic Hapludolls
Varna	Fine, illitic, mesic Typic Argiudolls
Watseka	Sandy, mixed, mesic Aquic Hapludolls
Wea	Fine-loamy, mixed, mesic Typic Argiudolls
*Wesley	Coarse-loamy, mixed, mesic Aquic Hapludolls
Zook	Fine, montmorillonitic, mesic Cumulic Haplaquolls

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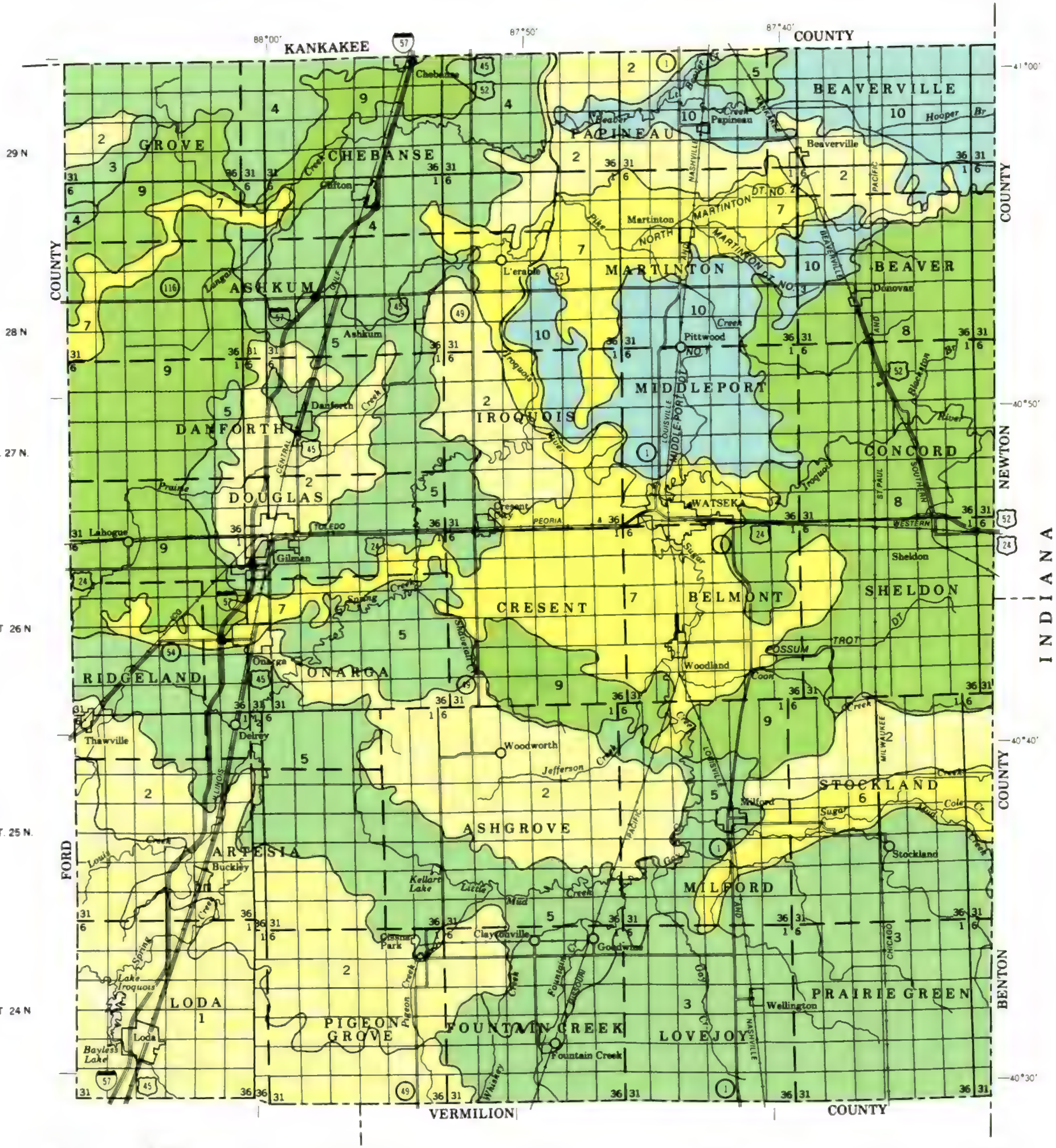


U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ILLINOIS AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP
IROQUOIS COUNTY, ILLINOIS

Scale 1:253,440

1 0 1 2 3 4 Miles

1 0 1 2 3 4 5 6 Kilometers

N

SOIL LEGEND*

NEARLY LEVEL AND GENTLY SLOPING SOILS THAT HAVE A VERY SLOWLY PERMEABLE OR SLOWLY PERMEABLE SUBSOIL; ON UPLANDS

1 Rowe-Clarence association: Poorly drained and somewhat poorly drained, silty soils that formed in colluvial sediments, loess, or silty material and in the underlying glacial till

2 Bryce-Swygert association: Poorly drained and somewhat poorly drained, clayey and silty soils that formed in lacustrine deposits and in the underlying glacial till

NEARLY LEVEL AND GENTLY SLOPING SOILS THAT DOMINANTLY HAVE A MODERATELY SLOWLY PERMEABLE SUBSOIL; ON UPLANDS

3 Milford-Lisbon association: Poorly drained and somewhat poorly drained, silty soils that formed in lacustrine deposits or in loess or silty material and the underlying glacial till

4 Ashkum-Elliott association: Poorly drained and somewhat poorly drained, silty and loamy soils that formed in loess or silty material and the underlying glacial till

5 Milford-Martinton association: Poorly drained and somewhat poorly drained, silty soils that formed in lacustrine deposits

NEARLY LEVEL SOILS THAT HAVE A MODERATELY PERMEABLE SUBSOIL; ON UPLANDS AND BOTTOM LAND

6 Wea-Comfrey association: Well drained and poorly drained, silty and loamy soils that formed in glacial outwash and alluvium

7 Ridgeville-Selma association: Somewhat poorly drained and poorly drained, loamy soils that formed in glacial outwash

NEARLY LEVEL SOILS THAT HAVE A MODERATELY PERMEABLE OR MODERATELY SLOWLY PERMEABLE SUBSOIL; ON UPLANDS

8 Selma-La Hogue-Odell association: Poorly drained and somewhat poorly drained, loamy and silty soils that formed in glacial outwash and glacial till

9 Pella-Milford association: Poorly drained, loamy and silty soils that formed in glacial outwash and lacustrine deposits

NEARLY LEVEL TO MODERATELY SLOPING SOILS THAT HAVE A MODERATELY RAPIDLY PERMEABLE OR RAPIDLY PERMEABLE SUBSOIL; ON UPLANDS

10 Gilford-Chelsea-Watseka association: Very poorly drained, excessively drained, and somewhat poorly drained, loamy and sandy soils that formed in glacial outwash and in wind- or water-deposited sand

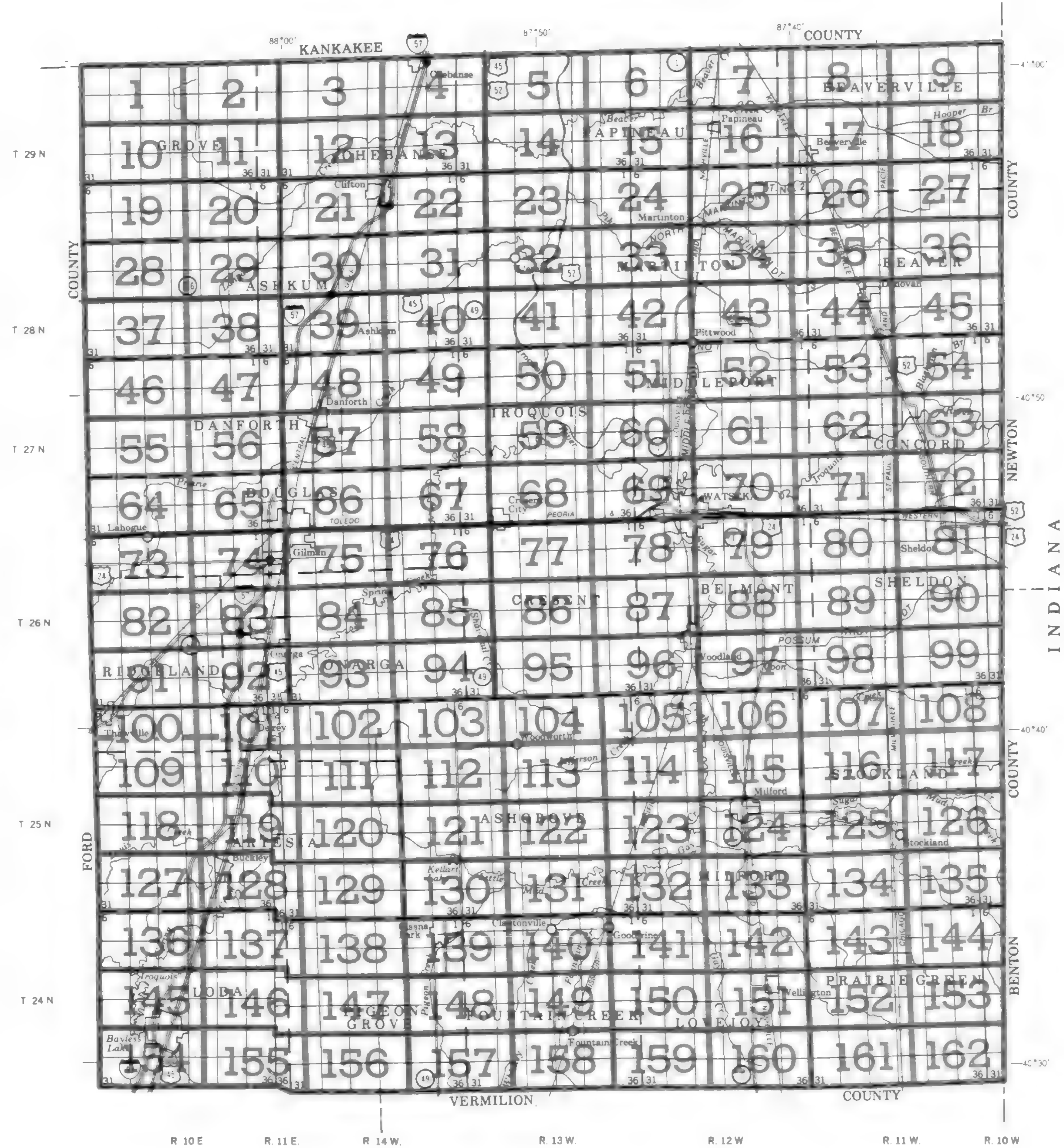
*Texture terms in the descriptive headings refer to the surface layer of the major soils in each association.

Compiled 1981

SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.



INDEX TO MAP SHEETS
IROQUOIS COUNTY, ILLINOIS

Scale 1: 253,440

1 0 1 2 3 4 Miles

1 0 1 2 3 4 5 6 Kilometers

Original text from each individual map sheet read:
This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline & neatline

AD HOC BOUNDARY (label)

- Small airport, airfield, park, oilfield, cemetery, or flood pool

STATE COORDINATE TICK

LAND DIVISION CORNERS (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEMS & DESIGNATIONS

- Interstate
- Federal
- State
- County, farm or ranch

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or small

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label)
- Located object (label)
- Tank (label)
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label)
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial
- Intermittent

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

DEPRESSION OR SINK

SOIL SAMPLE SITE (normally not shown)

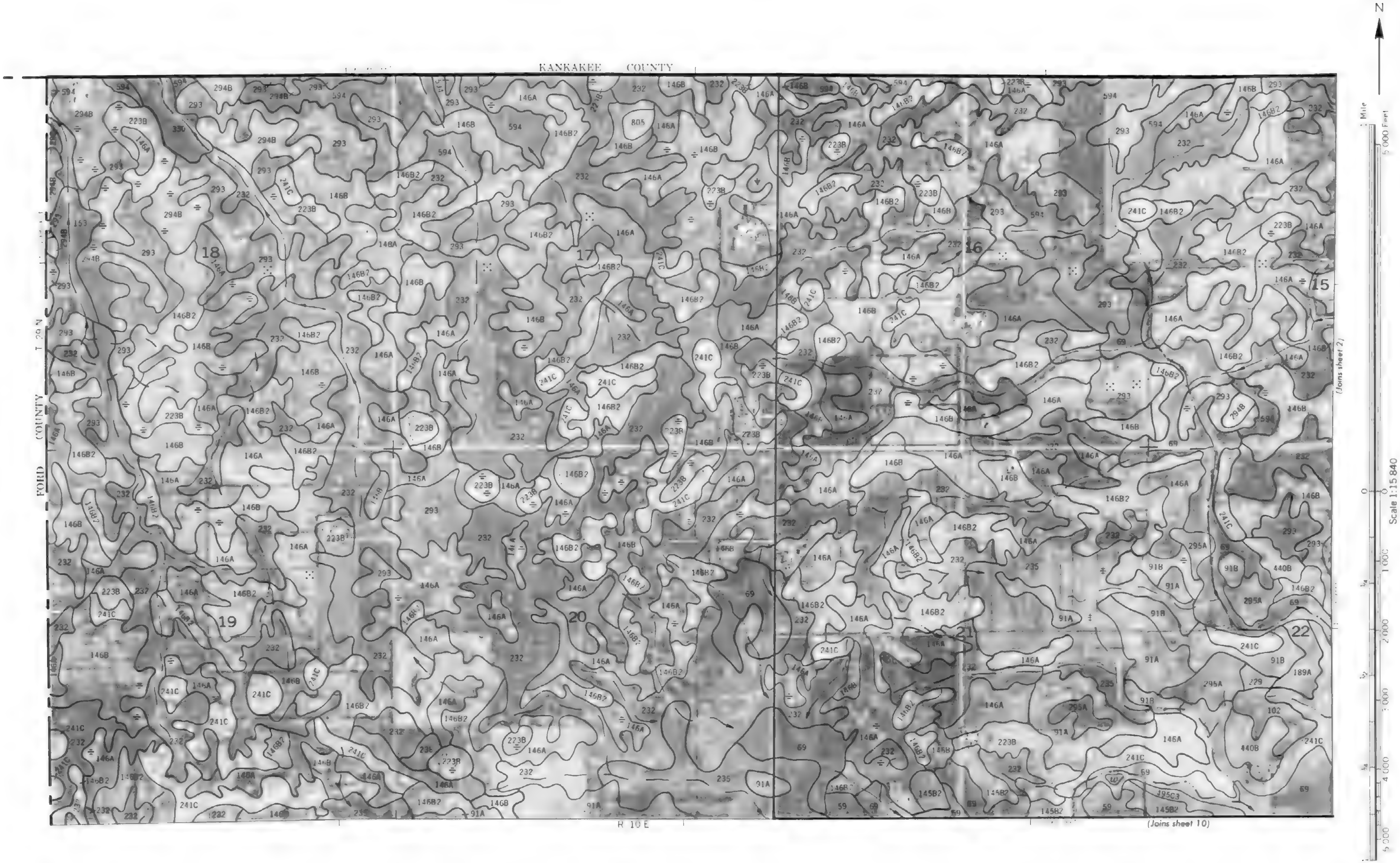
MISCELLANEOUS

- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot
- Muck spot
- Calcareous spot
- Grayish colored area up to 3 acres in size

SOIL LEGEND

Map symbols consist of numbers or a combination of numbers and a letter The initial numbers represent the kind of soil A capital letter following these numbers indicates the class of slope Symbols without a slope letter are for nearly level soils or miscellaneous areas A final number of 2 following the slope letter indicates that the soil is eroded and 3 that it is severely eroded

SYMBOL	NAME
27B	Miami silt loam, 1 to 5 percent slopes
49	Watseka loamy sand
59	Lisbon silt loam
69	Milford silty clay loam
88B	Sparta fine sand 1 to 5 percent slopes
91A	Swygert silty clay loam 0 to 2 percent slopes
91B	Swygert silty clay loam 2 to 5 percent slopes
102	La Hogue loam
103	Houghton muck
107	Sawmill silty clay loam
125	Selma loam
131B	Alvin fine sandy loam, 1 to 5 percent slopes
141A	Wesley fine sandy loam 0 to 3 percent slopes
145B2	Saybrook silt loam 2 to 5 percent slopes eroded
146A	Elliott loam 0 to 2 percent slopes
146B	Elliott loam, 2 to 5 percent slopes
146B2	Elliott silty clay loam 2 to 5 percent slopes eroded
147A	Clarence silty clay loam 0 to 3 percent slopes
147B2	Clarence silty clay loam 2 to 6 percent slopes eroded
150B	Onarga fine sandy loam, 1 to 5 percent slopes
151	Ridgeville fine sandy loam
153	Pella clay loam
178	Ruark fine sandy loam
184	Roby loamy fine sand
189A	Martinton silty clay loam 0 to 2 percent slopes
189B	Martinton silt loam, 2 to 5 percent slopes
189B2	Martinton silty clay loam 2 to 5 percent slopes eroded
192A	Del Rey silt loam 0 to 2 percent slopes
192B2	Del Rey silty clay loam 2 to 7 percent slopes, eroded
201	Gilford very fine sandy loam
223B	Varna loam 1 to 5 percent slopes
228B	Nappanee silt loam 1 to 6 percent slopes
229	Monee silty clay loam
230	Rowe silty clay loam
232	Ashkum silty clay loam
235	Bryce silty clay
238	Rantoul silty clay
241C	Chatsworth silty clay 4 to 10 percent slopes
241D	Chatsworth silty clay 10 to 20 percent slopes
284	Tice silt loam
293	Andres loam
294B	Symerton silt loam, 1 to 5 percent slopes
295A	Mokena loam, 0 to 3 percent slopes
306A	Allison silty clay loam 0 to 3 percent slopes
319	Aurelius muck
330	Peotone silty clay loam
375B	Rutland silty clay loam, 1 to 5 percent slopes
398	Wea silt loam
405	Zook silty clay
440B	Jasper silt loam, 1 to 5 percent slopes
443B	Barrington silt loam 1 to 3 percent slopes
484	Harco silt loam
490	Odell silt loam
495B	Corwin loam 1 to 5 percent slopes
495C3	Corwin clay loam, 5 to 12 percent slopes severely eroded
501	Morocco fine sand
513	Granby fine sandy loam
560E	St Clair loam 12 to 30 percent slopes
570B	Martinsville loam, 1 to 5 percent slopes
570C2	Martinsville loam 5 to 10 percent slopes, eroded
570D2	Martinsville loam, 10 to 18 percent slopes eroded
594	Reddick clay loam
741B	Oakville fine sand 1 to 5 percent slopes
741C	Oakville fine sand 5 to 12 percent slopes
776	Comfrey loam
779B	Chelsea fine sand 1 to 5 percent slopes
779C	Chelsea fine sand 5 to 12 percent slopes
802	Orthents loamy
805	Orthents clayey


N
KANKAKEE COUNTY
FORD COUNTY
T 29 N
R 10 E
(Joins sheet 2)
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1 Mile
5 000 Feet
Scale 1:15 840
15
16
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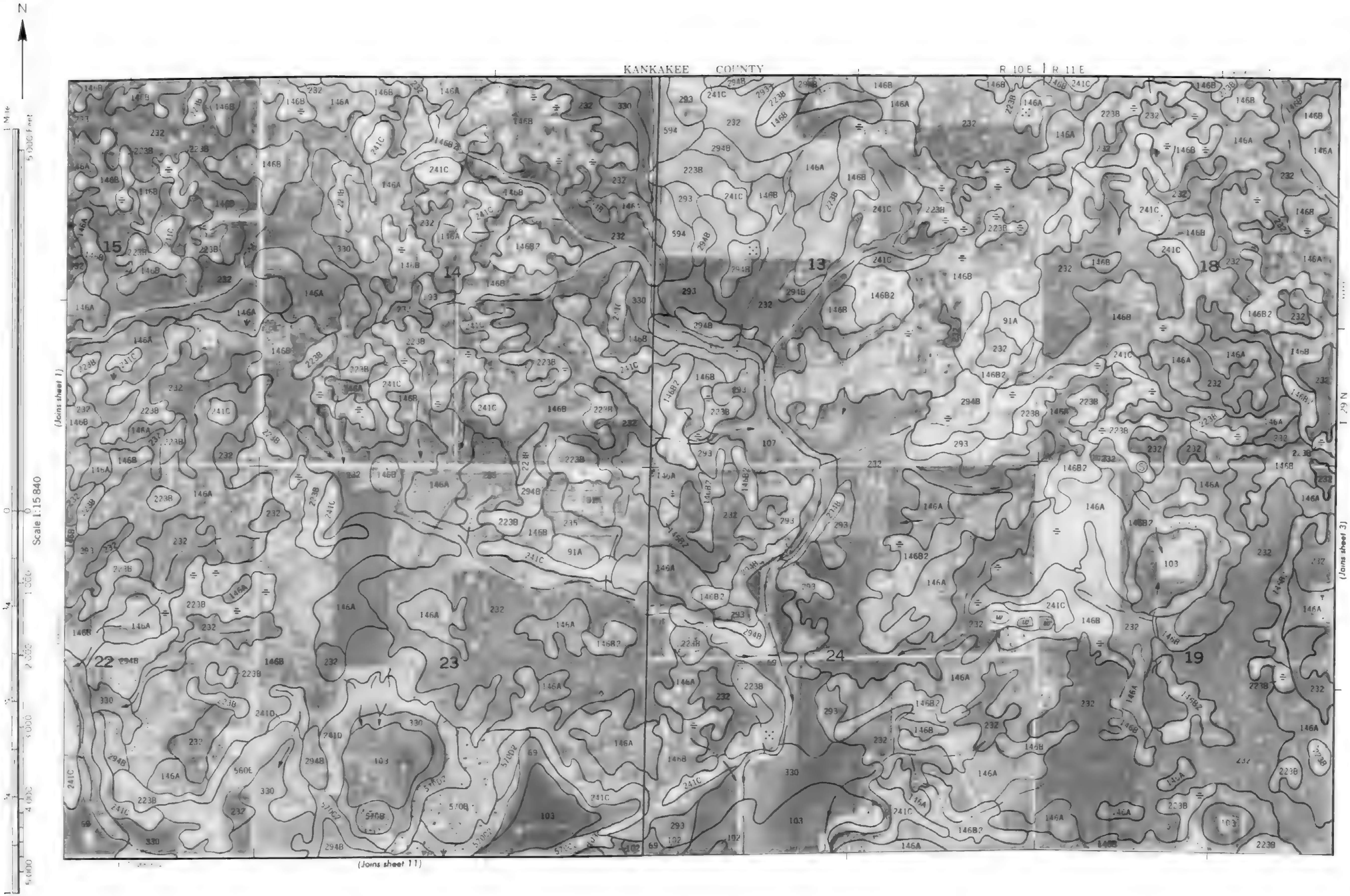
N
1 Mile
5 000 Feet
Scale 1:15 840
KANKAKEE COUNTY
R 10 E
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(Joins sheet 1)
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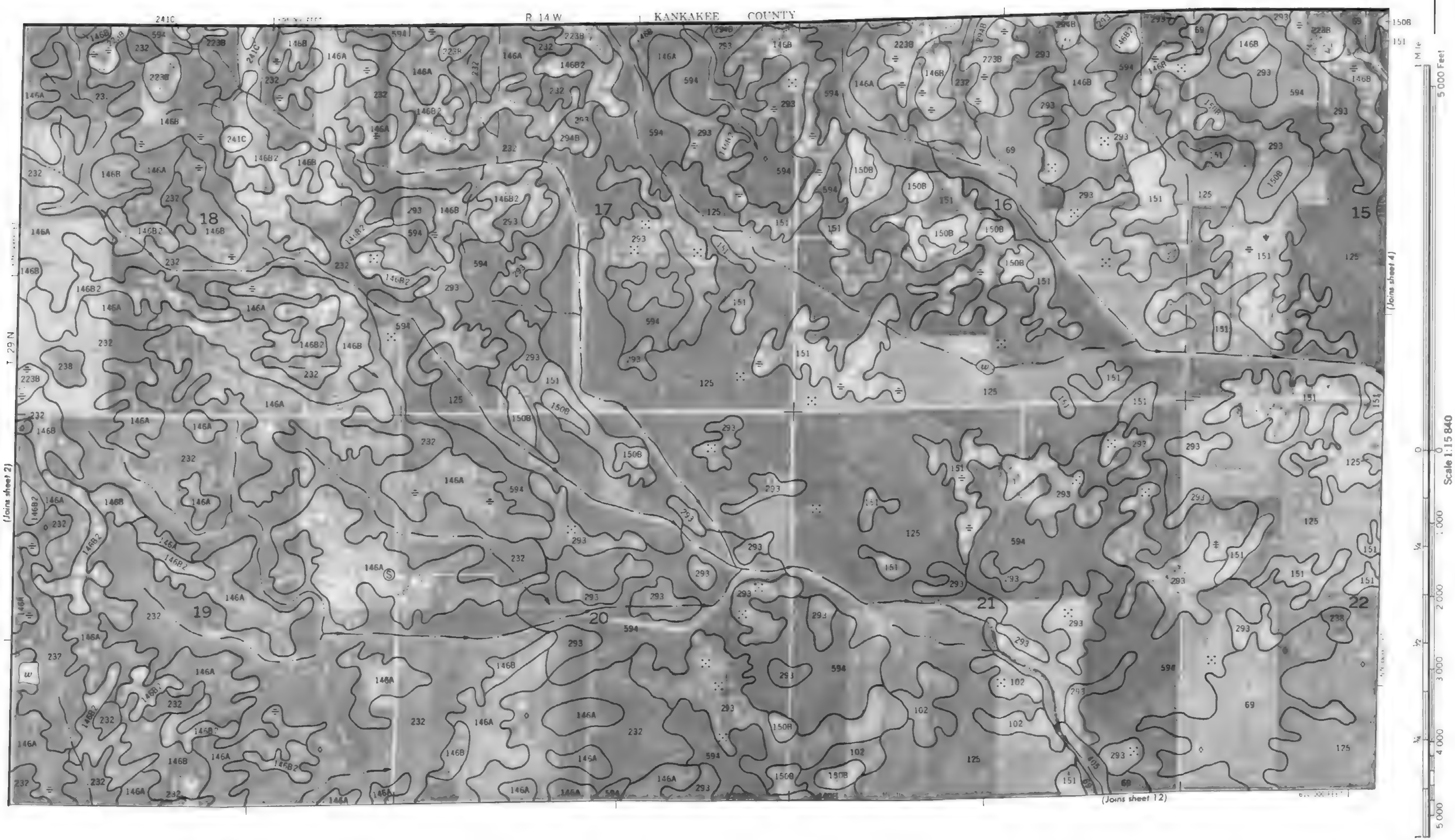
N
KANKAKEE COUNTY
R 14 W
T 29 N
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22
(Joins sheet 2)
(Joins sheet 4)
(Joins sheet 12)
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000


N
KANKAKEE COUNTY
R 14 W
R 13 W
T 29 N
CHEBANSE
water
(Joins sheet 3)
(Joins sheet 5)
(Joins sheet 13)
Scale 1:15 840
5 000 Feet
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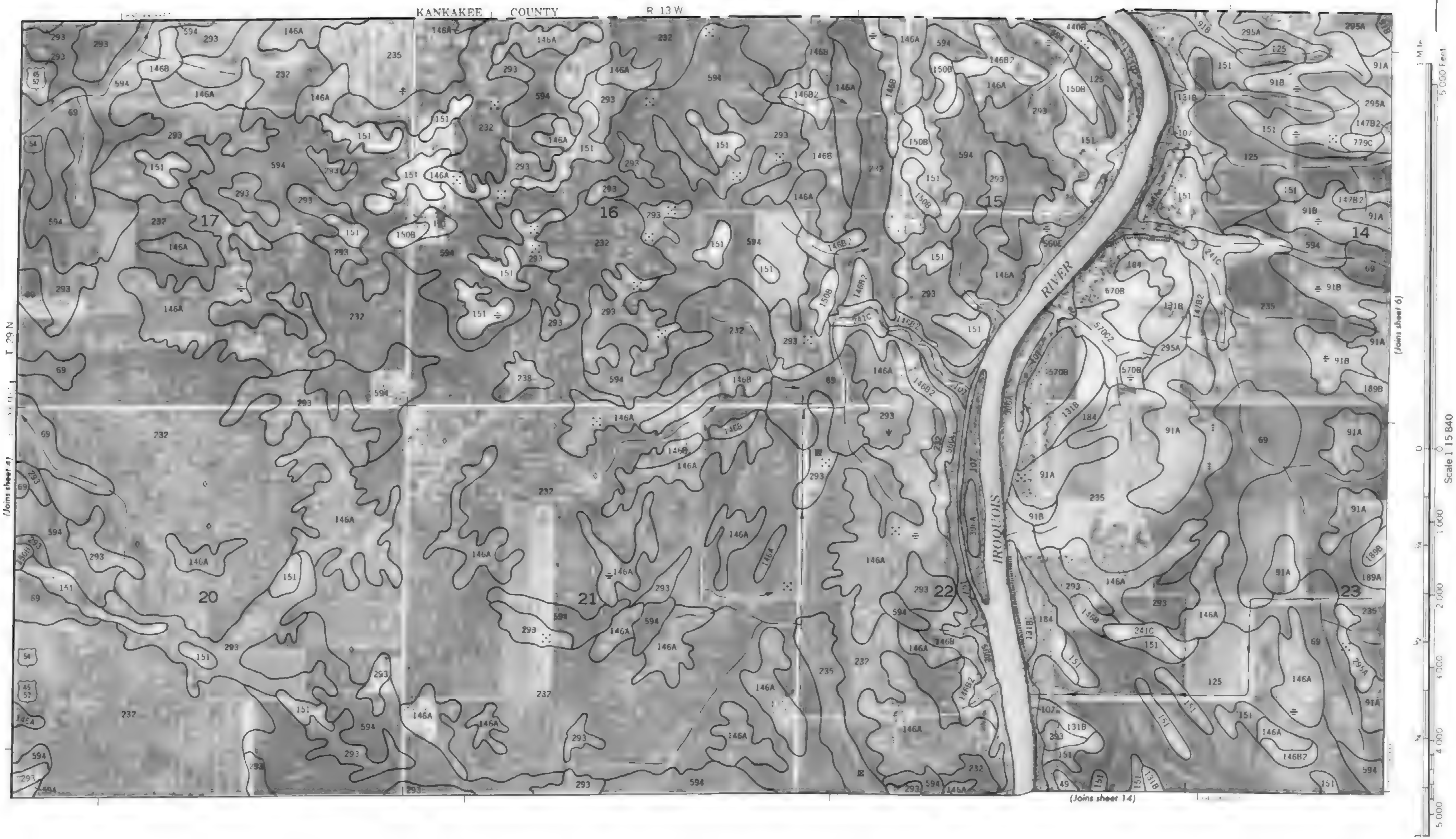
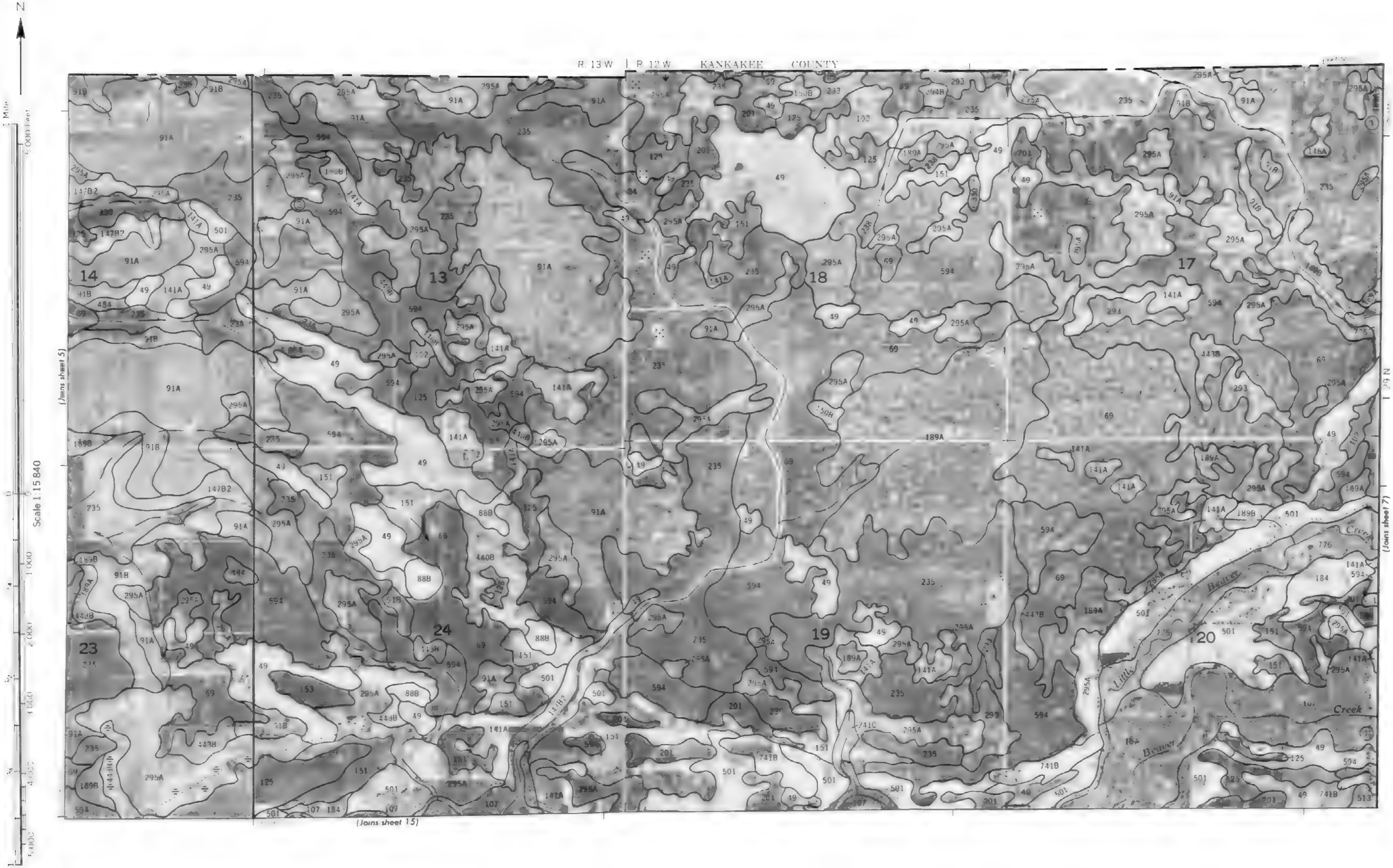
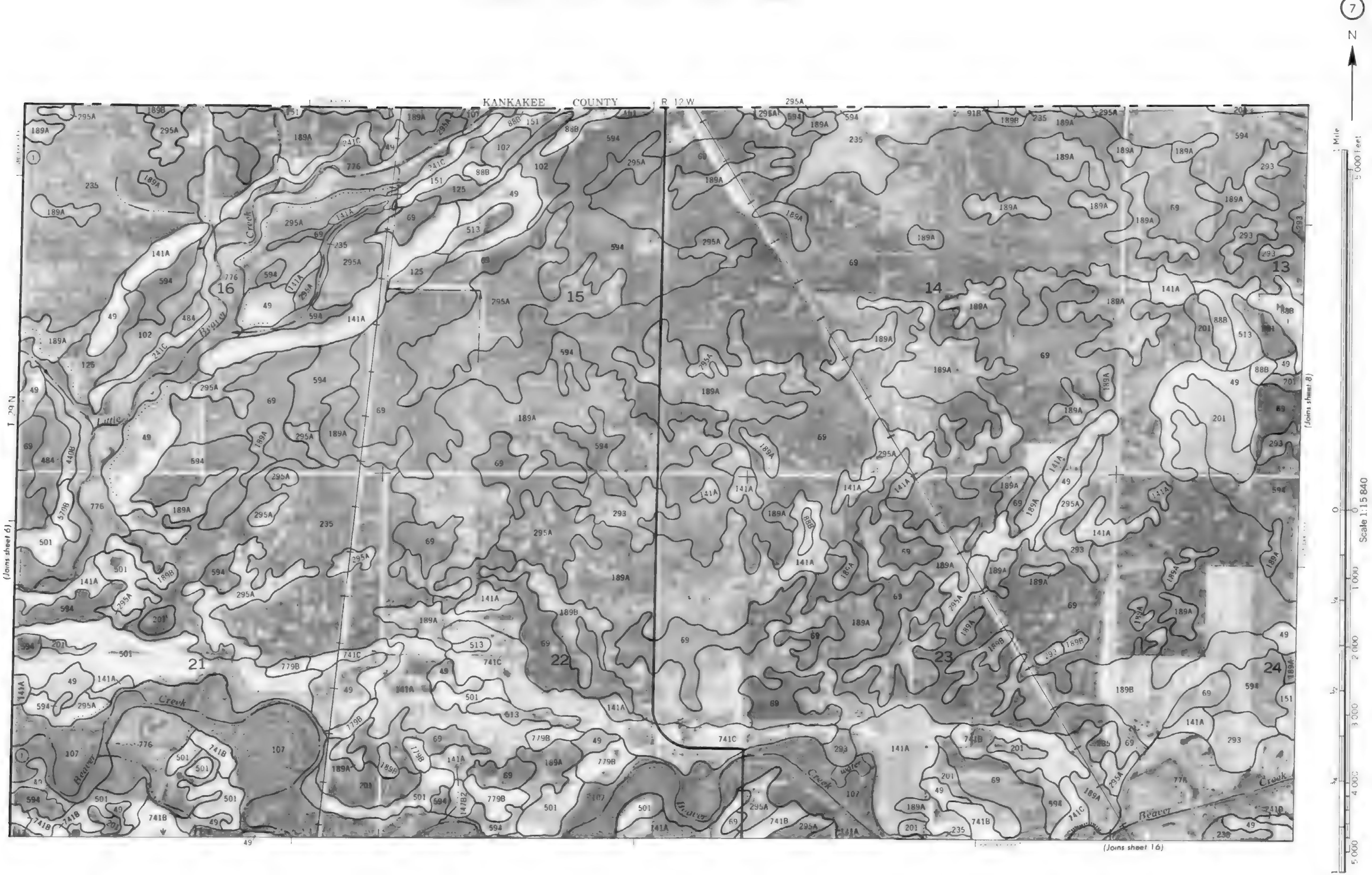
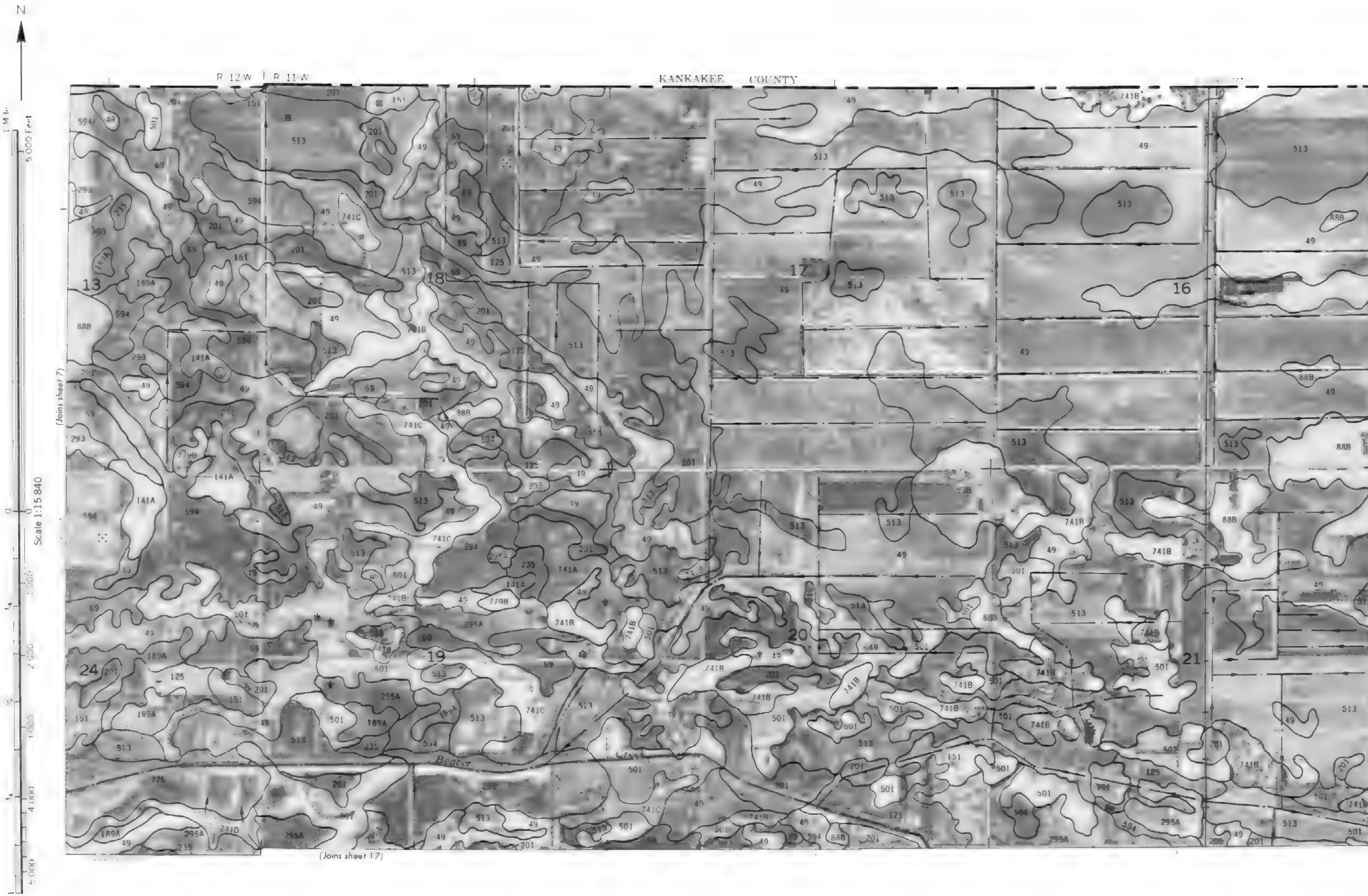
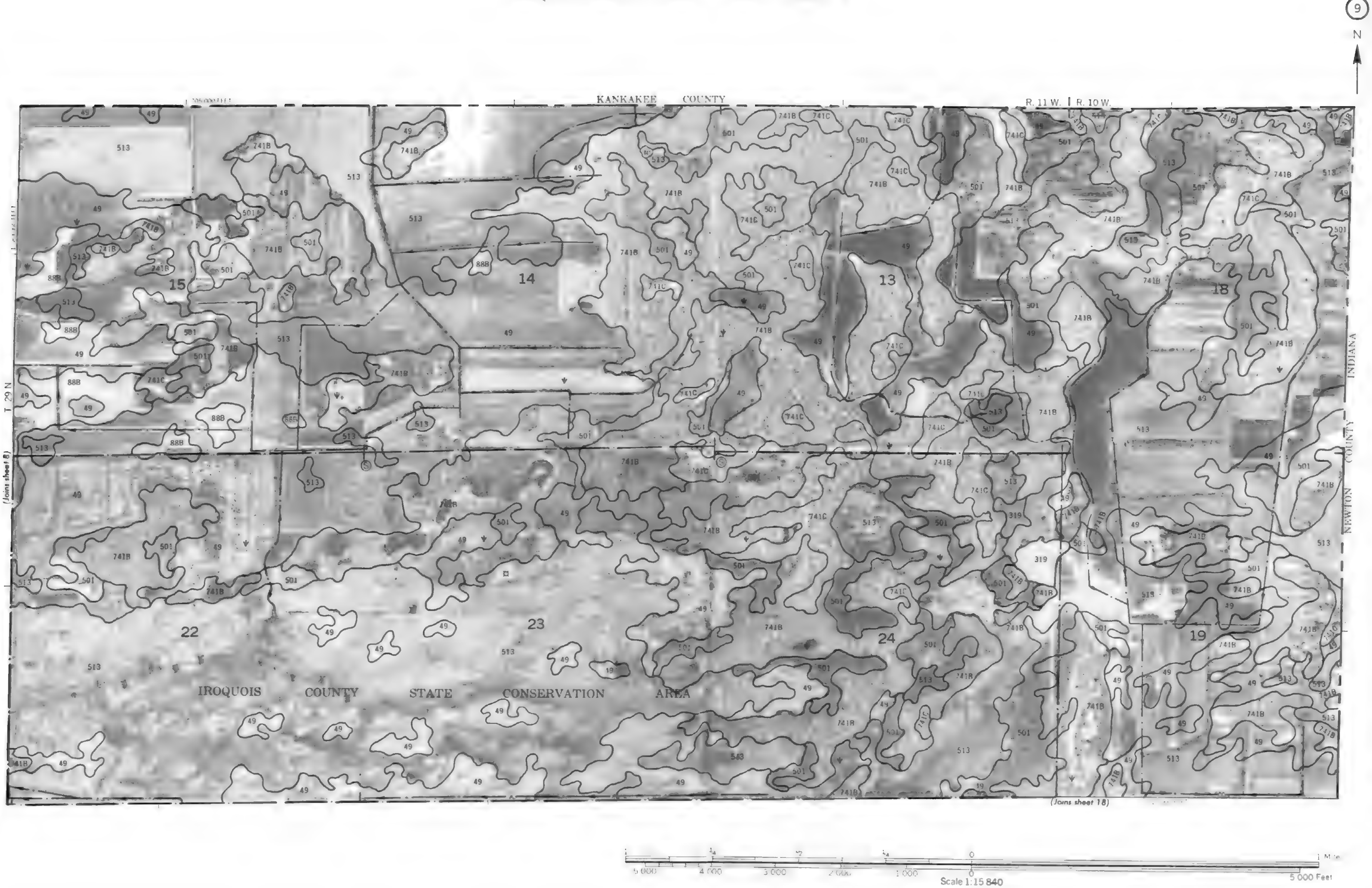

N
KANKAKEE COUNTY
R 13 W
T 29 N
17
16
15
14
20
21
22
23
IROQUOIS RIVER
(Joins sheet 4)
(Joins sheet 6)
(Joins sheet 14)
1 Mile
5 000 Feet
Scale 1:15 840


N
R. 13 W
R. 12 W
KANKAKEE COUNTY
T. 29 N
(Joins sheet 5)
(Joins sheet 7)
(Joins sheet 15)
Scale 1:15 840
1 Mile
5000 Feet
13
14
17
18
19
20
23
24
Little Beaver Creek
Beaver Creek

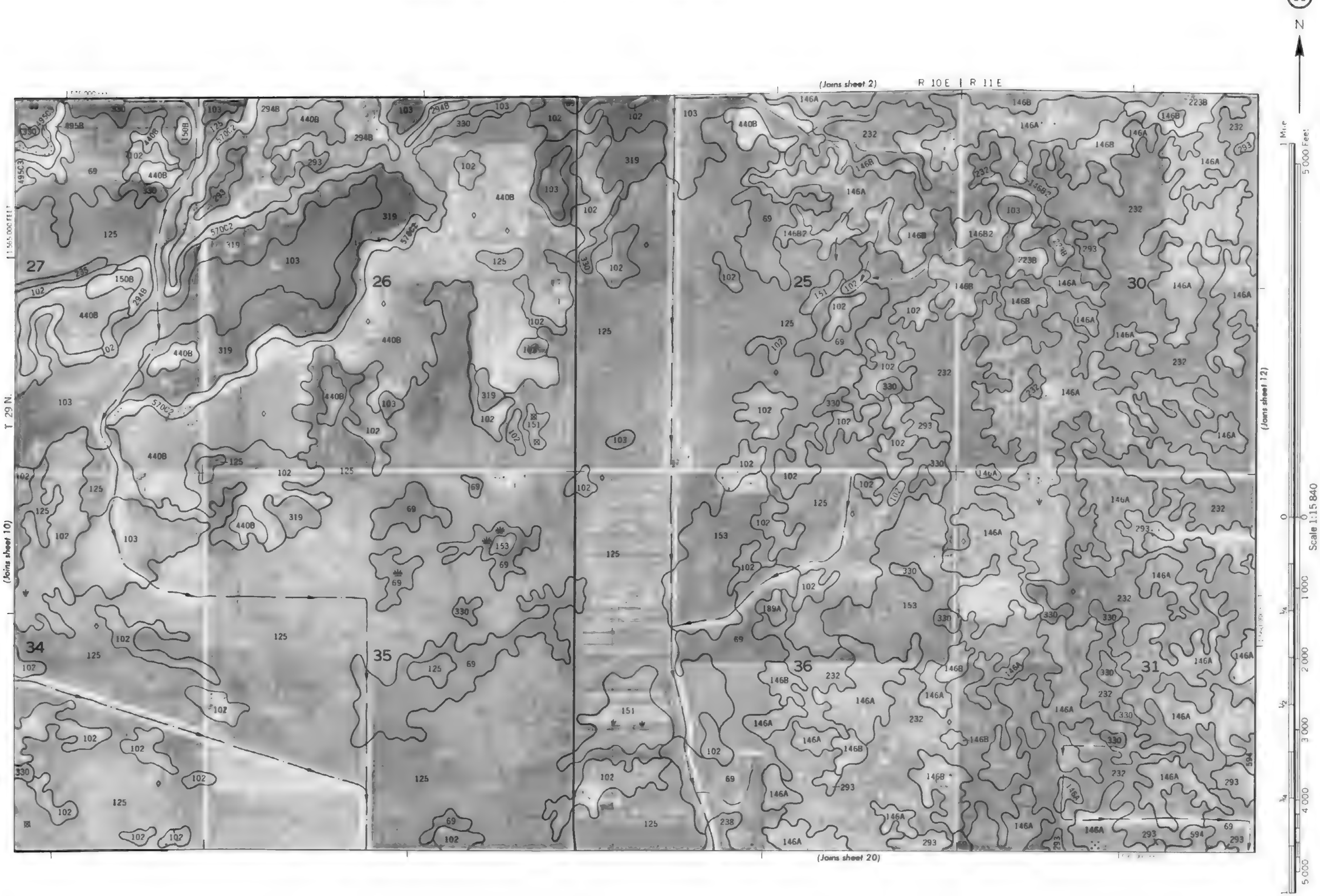
IROQUOIS COUNTY, ILLINOIS — SHEET NUMBER 7



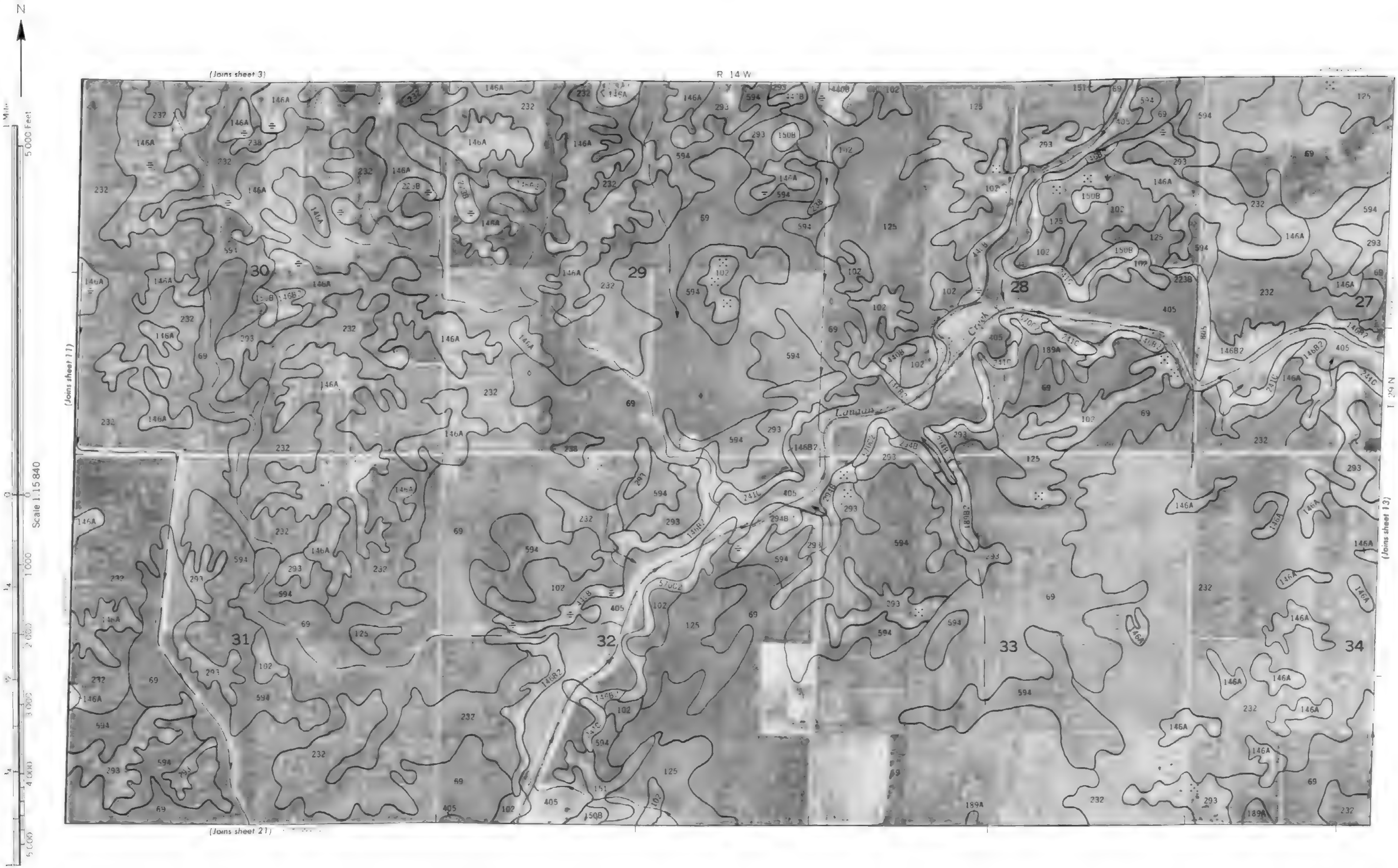

N
Scale 1:15 840
KANKAKEE COUNTY
R 12 W
R 11 W
T 29 N
(Joins sheet 7)
(Joins sheet 9)
(Joins sheet 17)
Beaver Creek
13
16
17
18
19
20
21
24

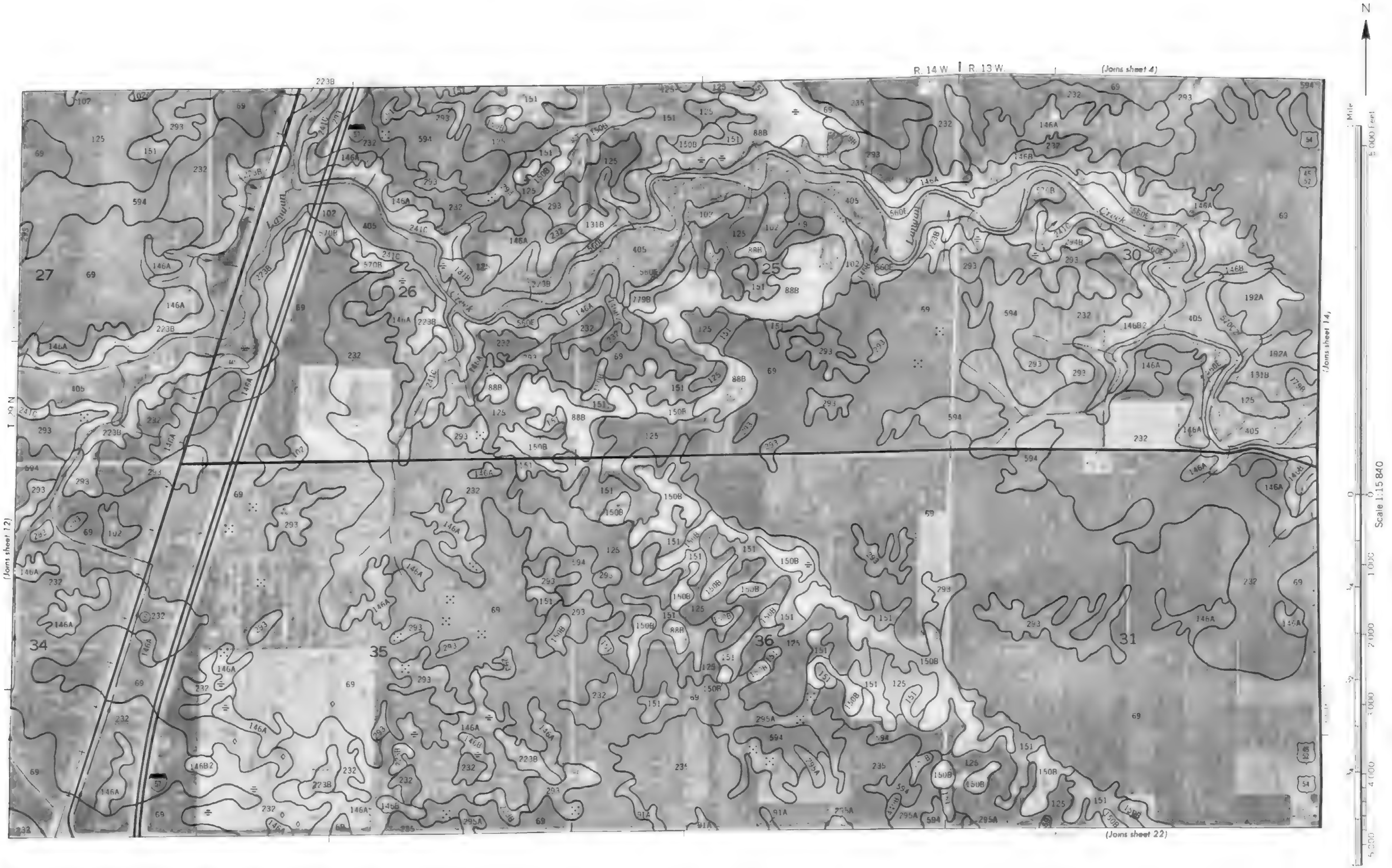

9
N
KANKAKEE COUNTY
R. 11 W.
R. 10 W.
T. 29 N.
(Joins sheet 8)
(Joins sheet 18)
NEWTON COUNTY
INDIANA
IROQUOIS COUNTY STATE CONSERVATION AREA
13
14
15
18
19
22
23
24
Scale 1:15 840
5 000 Feet
1 Mile


N
1 Mile
5 000 Feet
Scale 1:15 840
(Joins sheet 1)
R 10 E
FORD COUNTY
T 29 N
(Joins sheet 11)
(Joins sheet 19)
30
29
28
27
31
32
33
34

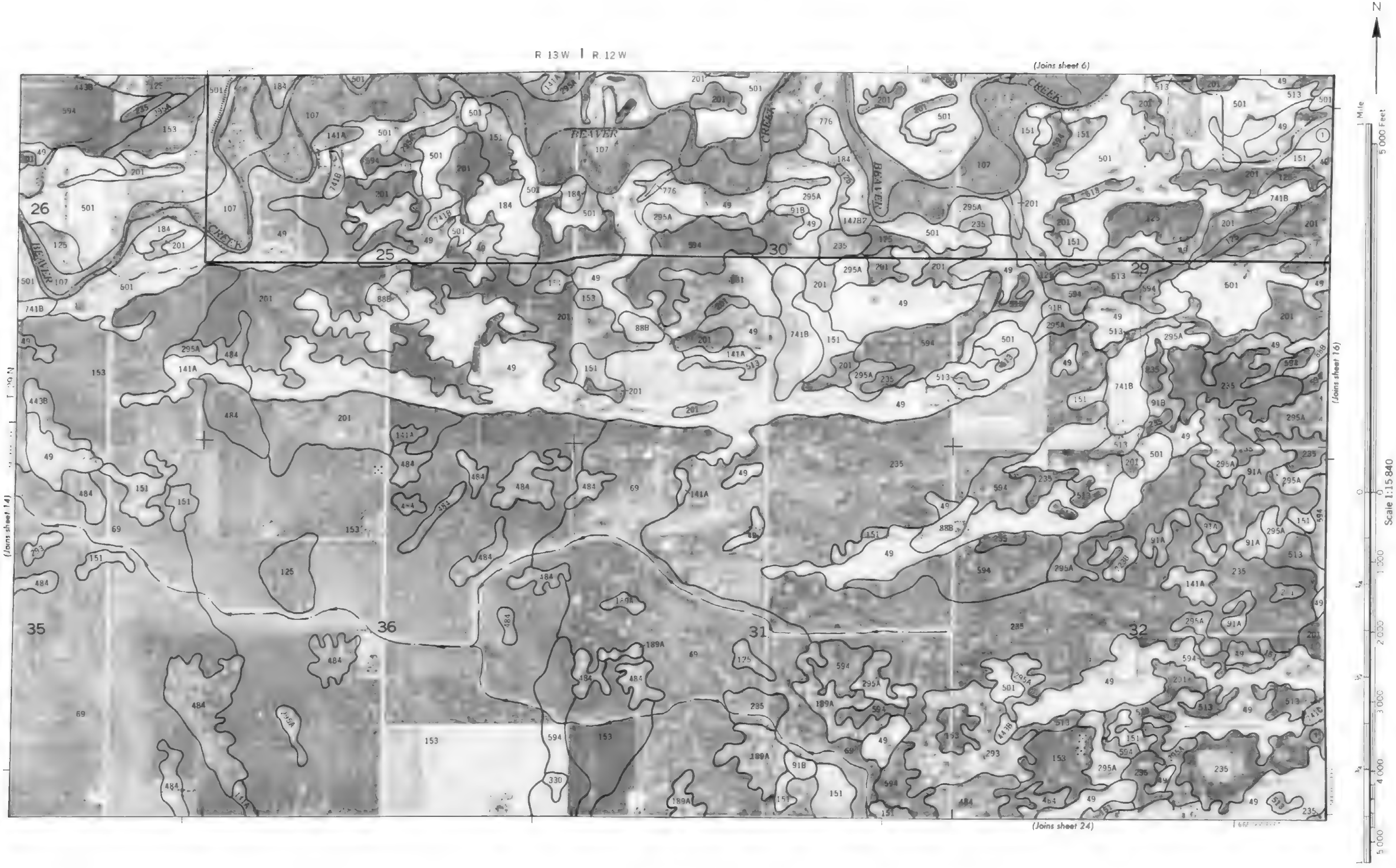

11
N
(Joins sheet 2)
R 10 E | R 11 E
(Joins sheet 10)
(Joins sheet 12)
(Joins sheet 20)
T 29 N.
27
26
25
30
34
35
36
31
1 Mile
5 000 Feet
Scale 1:15 840
0
1000
2000
3000
4000
5000
¼
½
¾

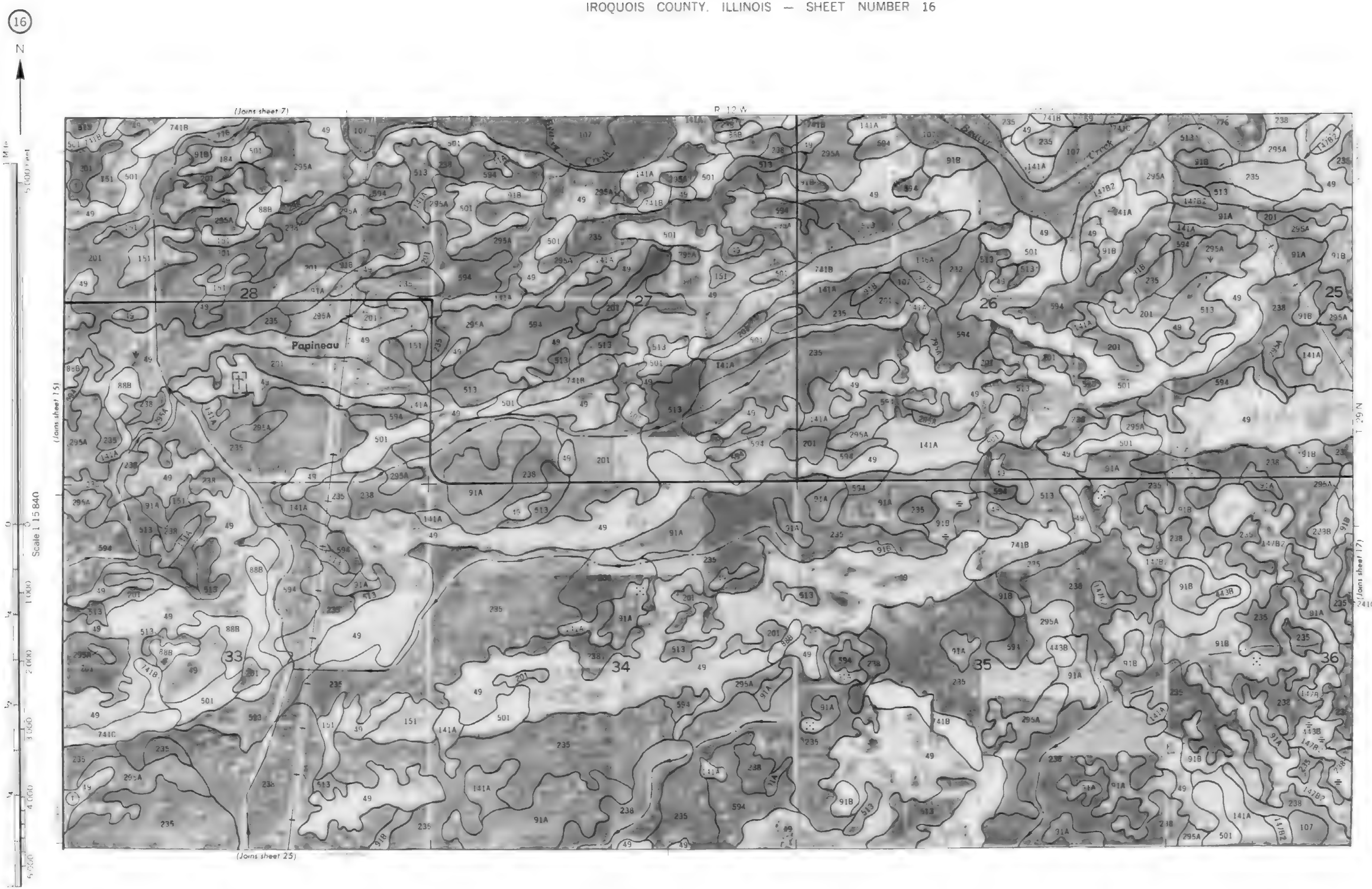
12


N
1 Mile
5 000 Feet
Scale 1:15 840
(Joins sheet 3)
R. 14 W.
(Joins sheet 11)
(Joins sheet 13)
T. 29 N.
(Joins sheet 21)
30
29
28
27
31
32
33
34
Longdon
Creek


N
R. 14 W.
R. 13 W.
(Joins sheet 4)
(Joins sheet 14)
(Joins sheet 22)
(Joins sheet 12)
T. 29 N.
Scale 1:15 840
1 Mile
5 000 Feet
27
26
25
30
34
35
36
31


N
1 Mile
5 000 Feet
Scale 1:15 840
(Joins sheet 5)
R 13 W
(Joins sheet 13)
(Joins sheet 15)
(Joins sheet 23)
T 29 N
LANGAN CREEK
BEAVER CREEK
IROQUOIS RIVER
water
26
27
28
29
32
33
34
35

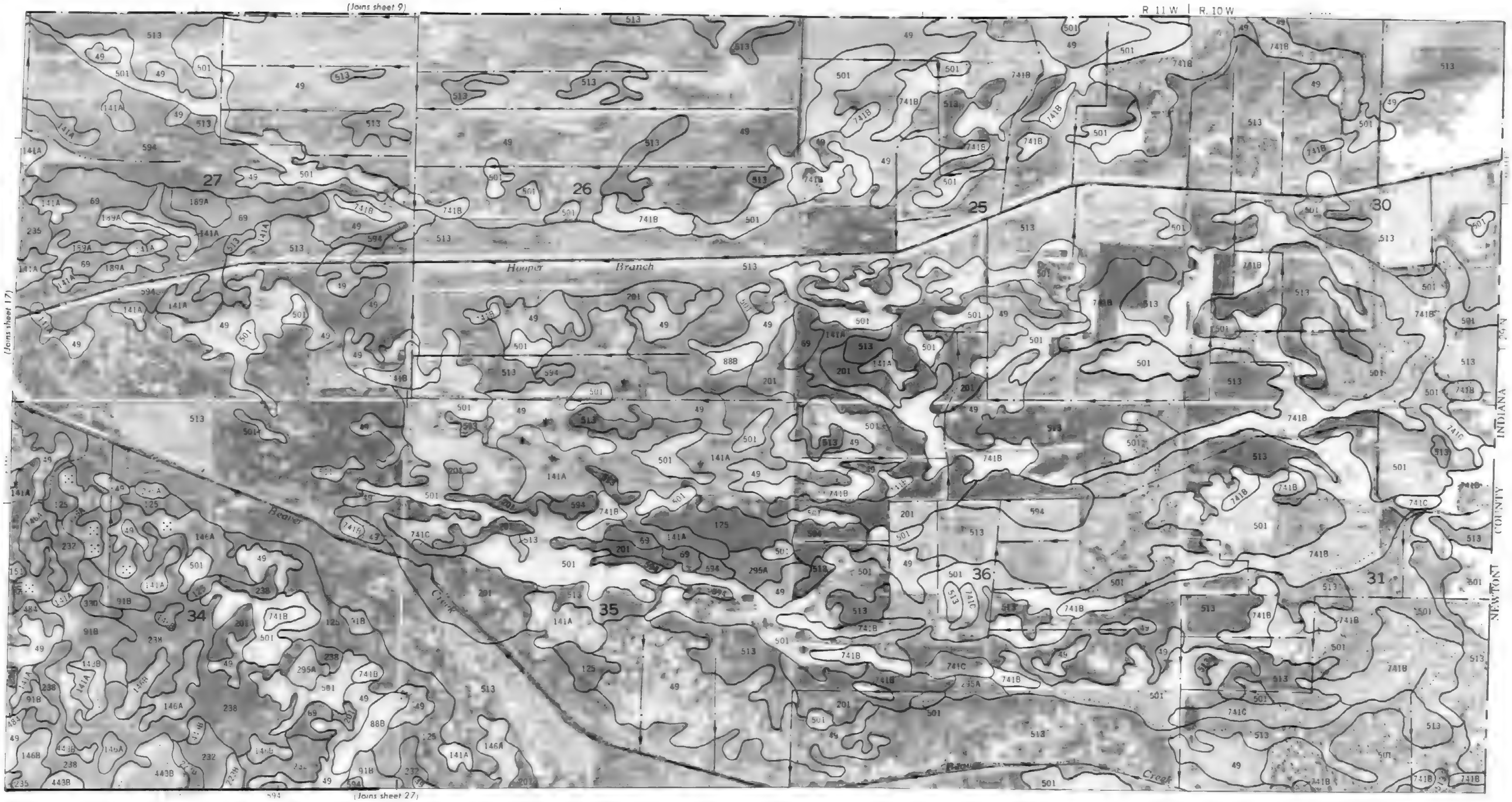

15
N
R 13 W
R 12 W
(Joins sheet 6)
(Joins sheet 16)
(Joins sheet 24)
(Joins sheet 14)
T 29 N
BEAVER
CREEK
26
25
30
29
35
36
31
32
1 Mile
5 000 Feet
Scale 1:15 840


16
N
(Joins sheet 7)
(Joins sheet 15)
(Joins sheet 17)
(Joins sheet 25)
R. 12 W.
T. 29 N.
Papineau
Beaver Creek
Scale 1:15 840
28
27
26
25
33
34
35
36


17
N
R 12 W.
R 11 W.
(Joins sheet 8)
(Joins sheet 18)
(Joins sheet 26)
(Joins sheet 16)
Beaverville
Beaver Creek
Scale 1:15 840

18

N

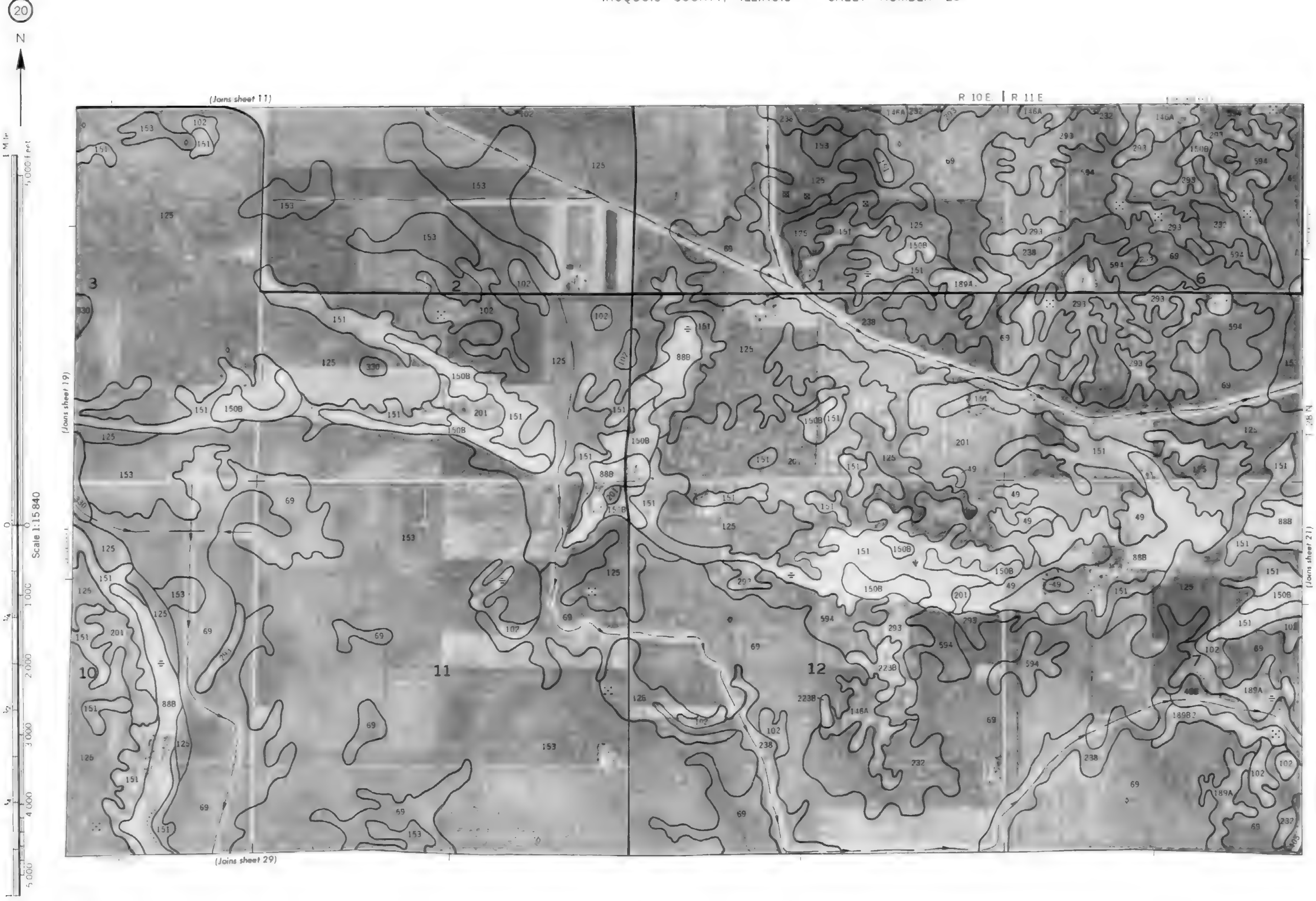


Scale 1:15 840

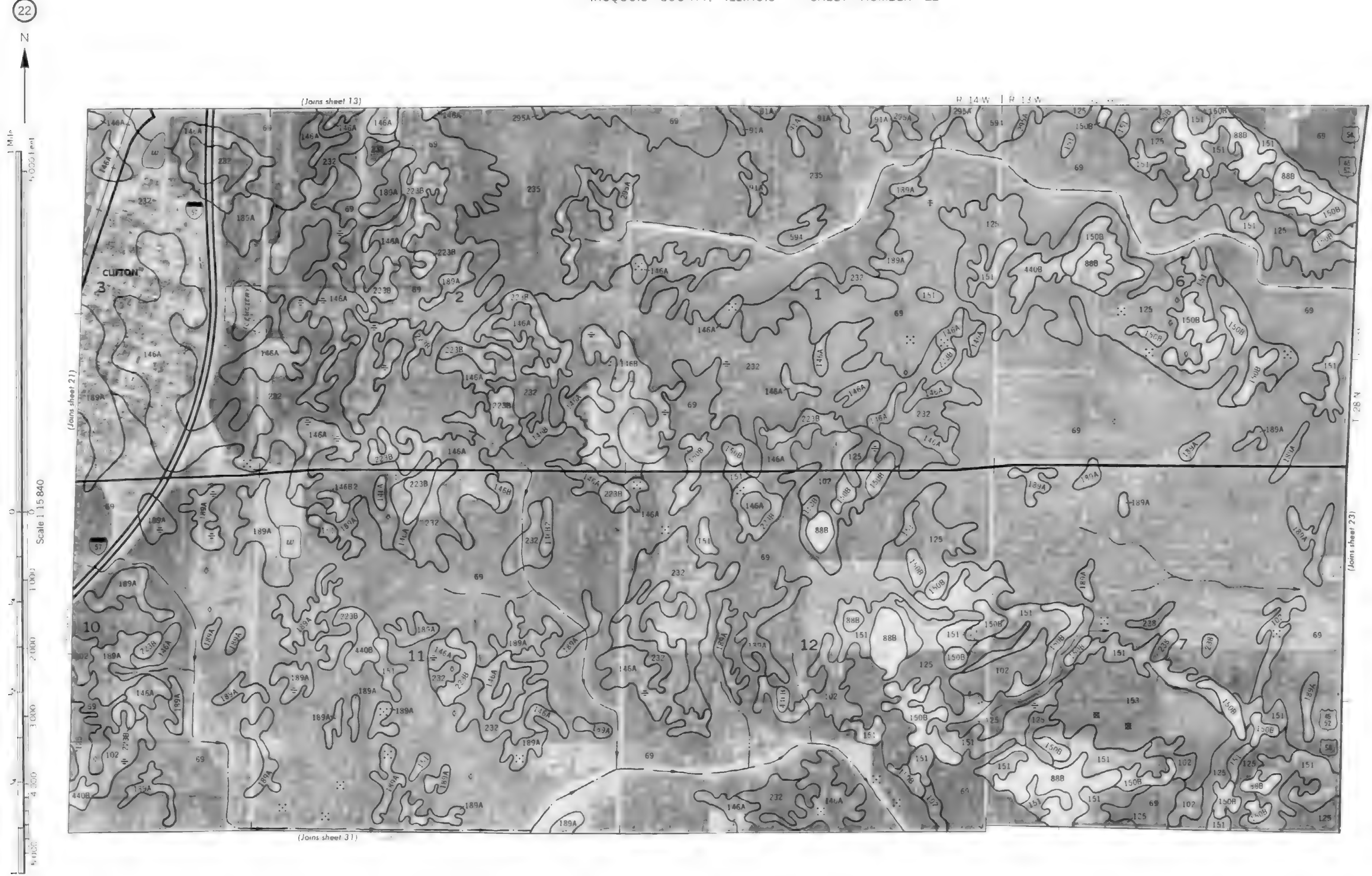
5 000 Feet

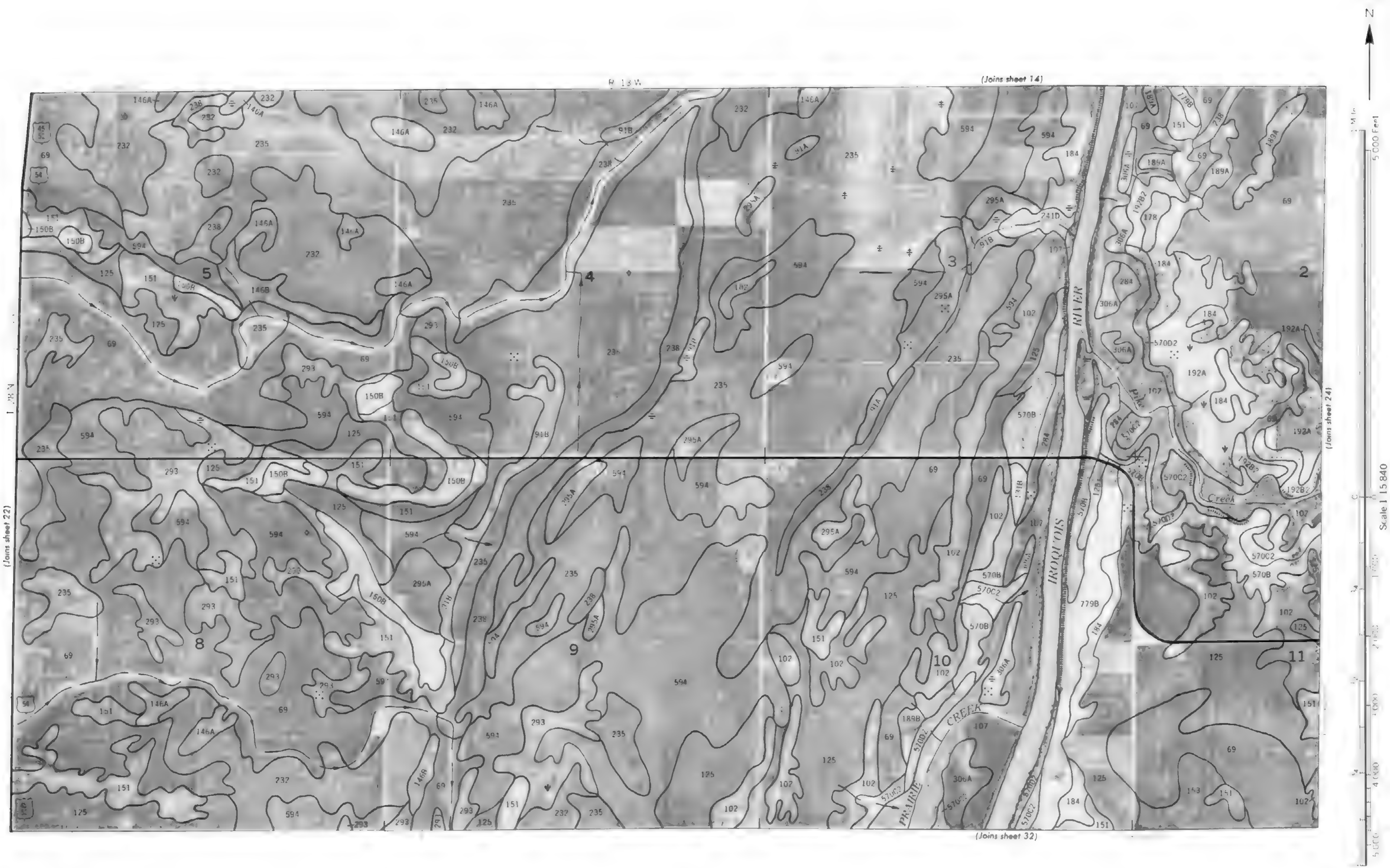
(19)


(Joins sheet 10)
R. 10 E.
(Joins sheet 20)
(Joins sheet 28)
FORD COUNTY
N
1 Mile
5 000 Feet
Scale 1:15 840
3
4
5
6
7
8
9
10

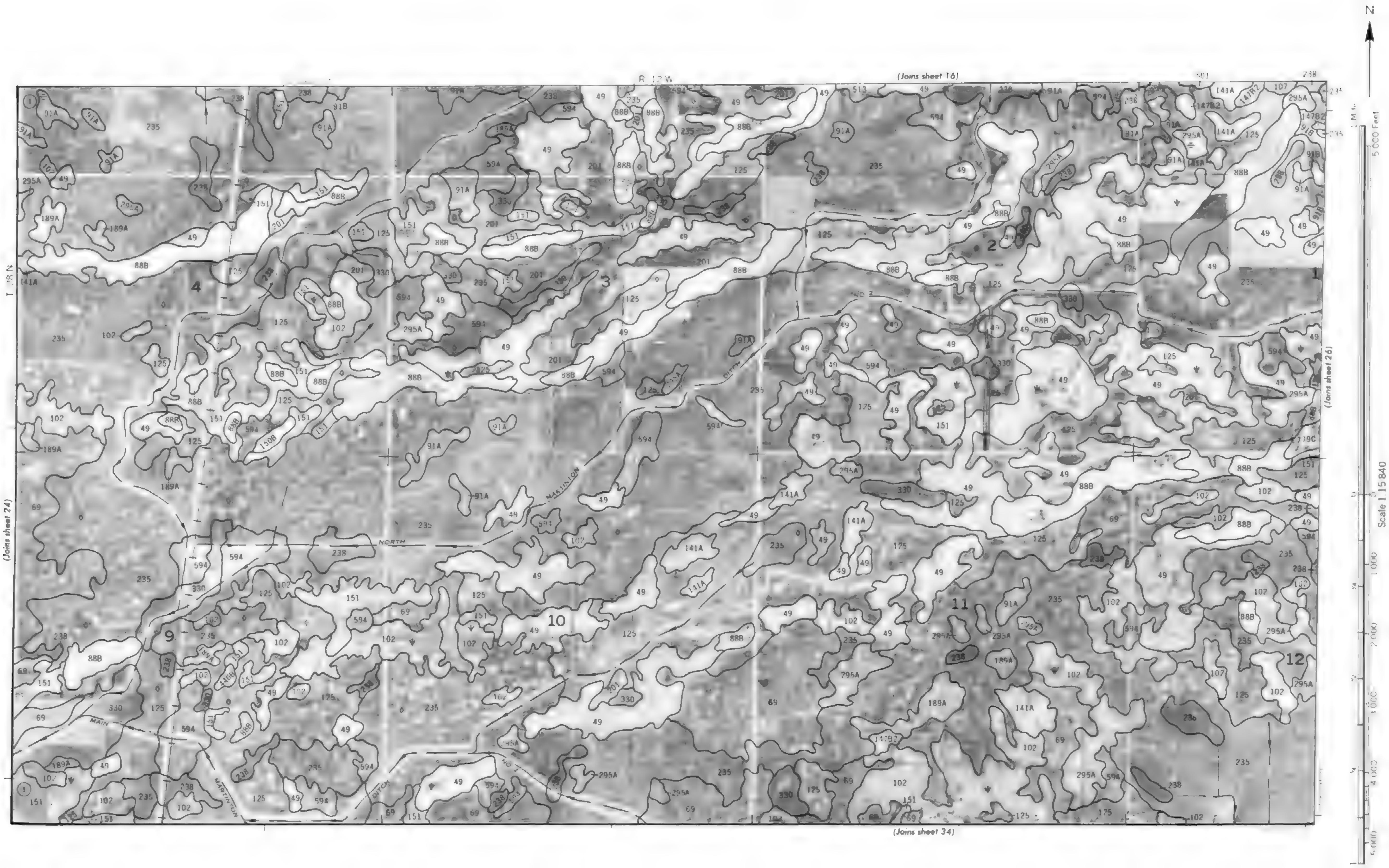

20
N
(Joins sheet 11)
(Joins sheet 19)
(Joins sheet 21)
(Joins sheet 29)
R 10 E. | R 11 E.
T 28 N.
Scale 1:15 840
1 Mile
5,000 Feet
0
1 000
2 000
3 000
4 000
5 000
3
2
1
6
10
11
12
7


N
R. 14 W.
(Joins sheet 12)
(Joins sheet 20)
(Joins sheet 22)
(Joins sheet 30)
CLIFTON
Creek
water
water
5 000 Feet
Scale 1:15 840

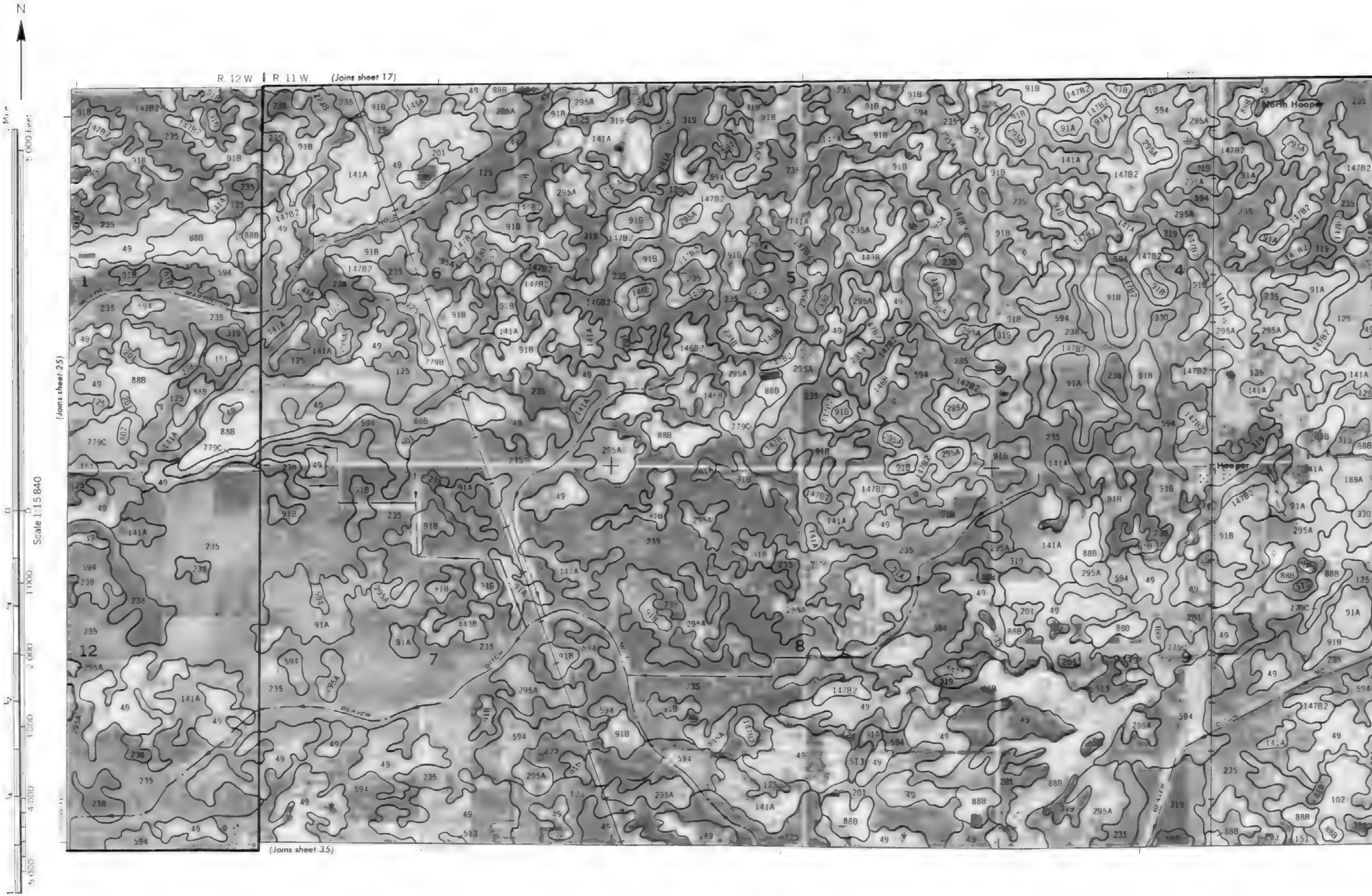

22
N
1 Mile
5000 Feet
Scale 1:15 840
(Joins sheet 13)
(Joins sheet 21)
(Joins sheet 23)
(Joins sheet 31)
R 14 W | R 13 W
T 28 N
CLIFTON
CEMETERY
57
45
52
54


N
(Joins sheet 14)
(Joins sheet 32)
(Joins sheet 22)
(Joins sheet 24)
R. 13 W.
T. 28 N.
IROQUOIS
RIVER
PRAIRIE
CREEK
Creek
Scale 1:15 840
1 Mile
5 000 Feet

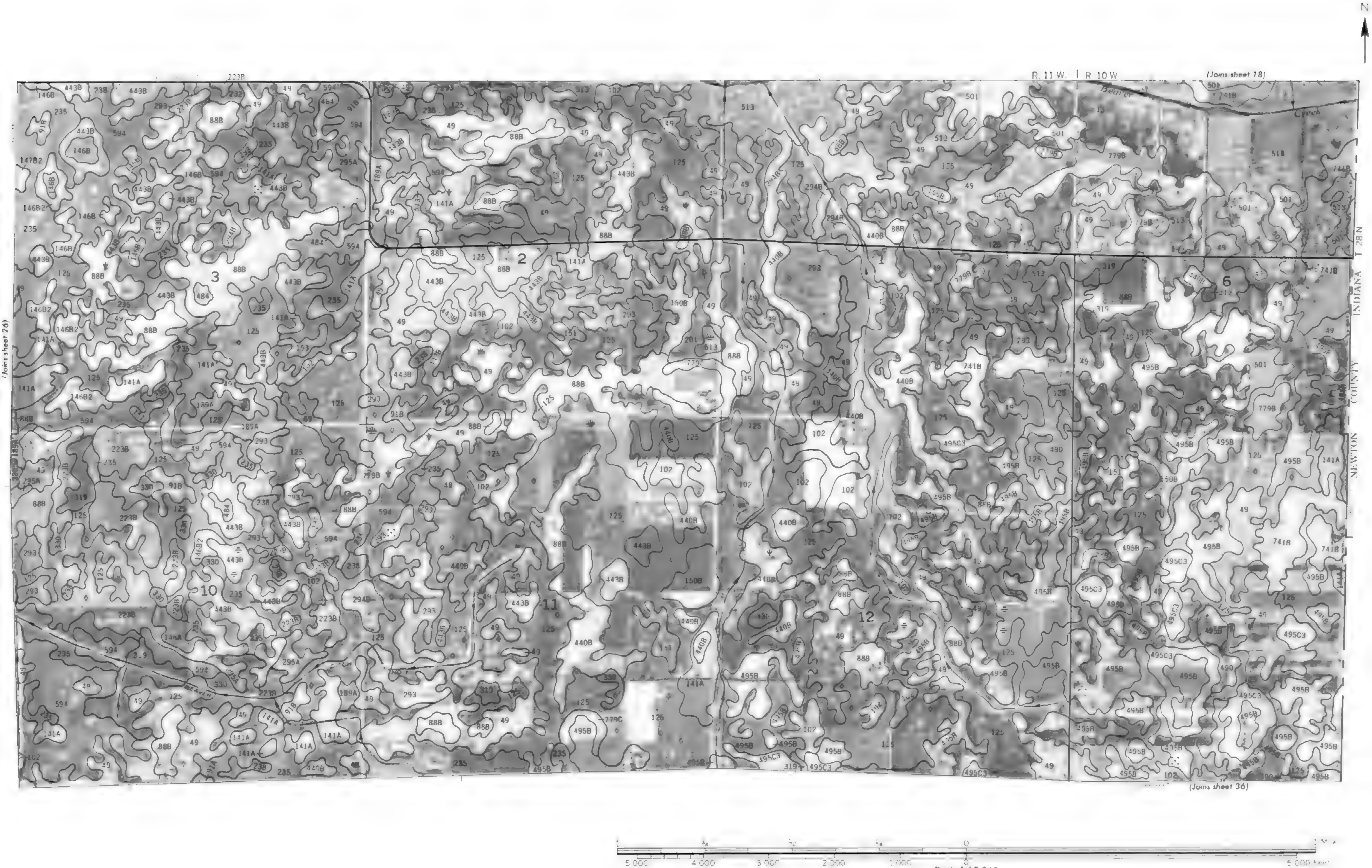

N
R. 13 W.
R. 12 W.
(Joins sheet 15)
(Joins sheet 23)
(Joins sheet 25)
(Joins sheet 33)
Scale 1:15 840
1 Mile
5 000 Feet

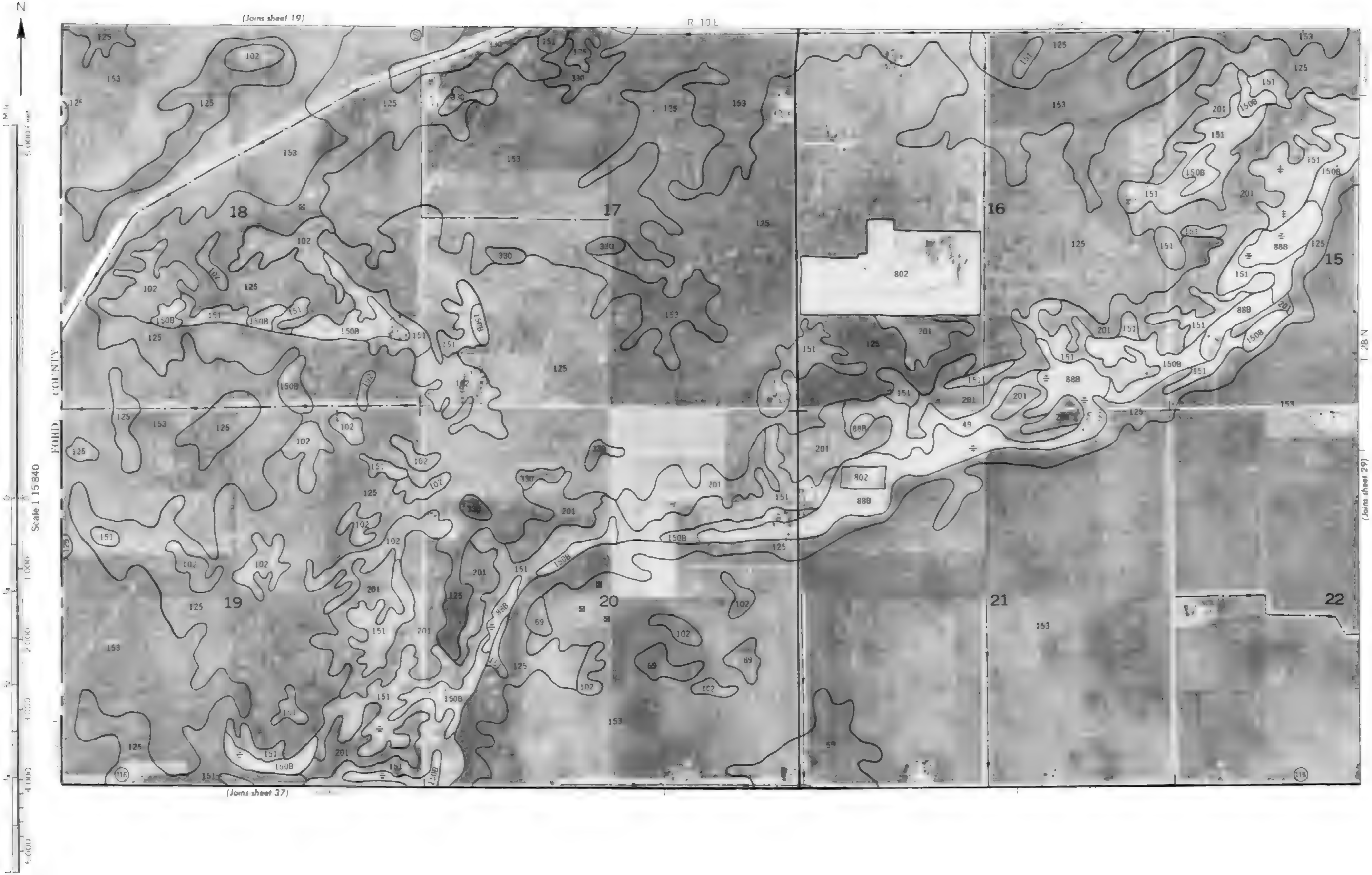

25
N
R. 12 W.
T. 28 N.
(Joins sheet 16)
(Joins sheet 34)
(Joins sheet 24)
(Joins sheet 26)
Scale 1:15 840
5000 Feet
MARTINTON
NORTH
MAIN
DITCH

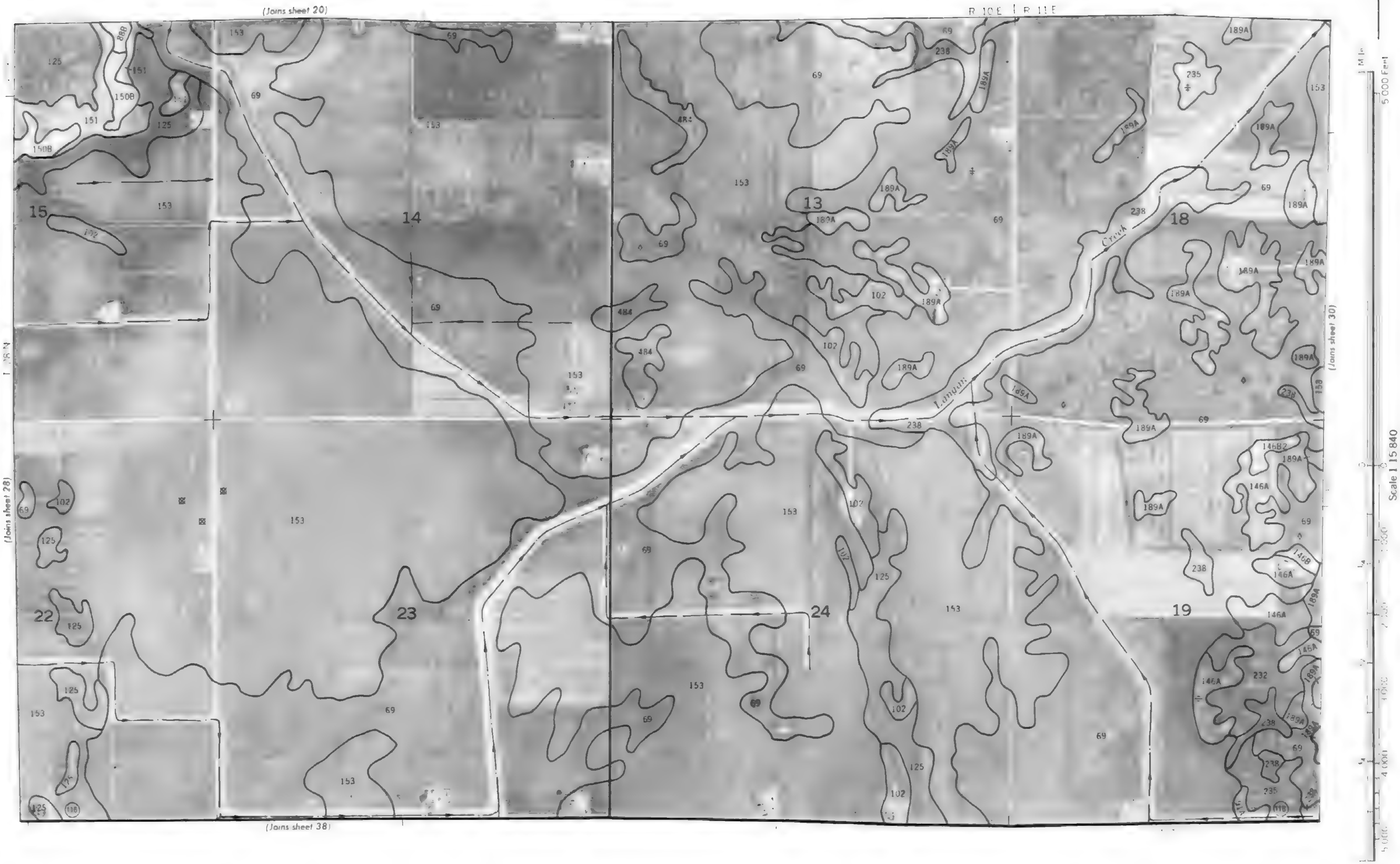
26



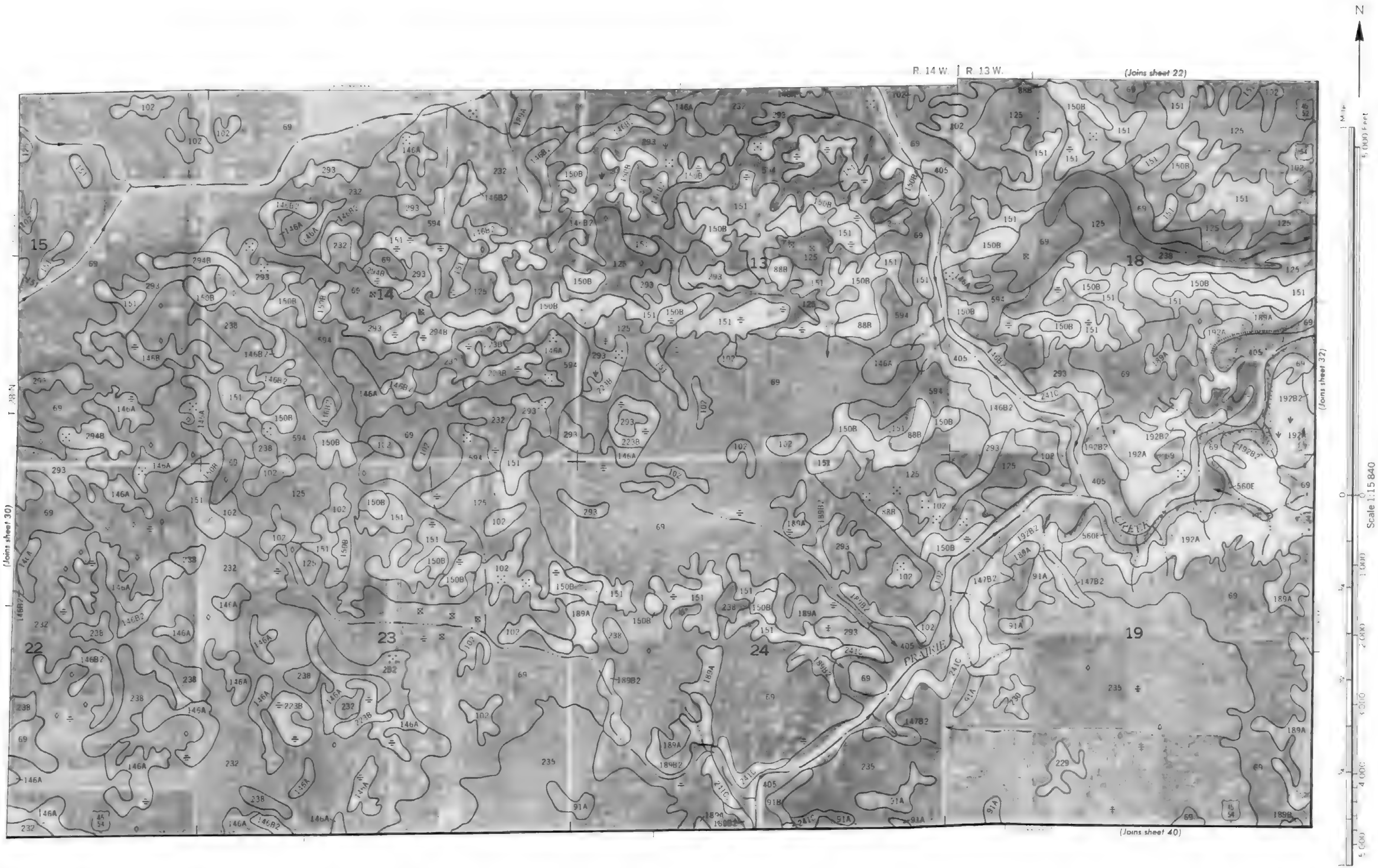
N
R. 12 W.
R. 11 W.
(Joins sheet 17)
(Joins sheet 25)
(Joins sheet 27)
(Joins sheet 35)
T. 28 N.
North Hooper
Hooper
Scale 1:15 840


N
R 11 W.
R 10 W
(Joins sheet 18)
(Joins sheet 26)
(Joins sheet 36)
T 28 N
INDIANA
NEWTON COUNTY
Bear Creek
Scale 1:15 840
5 000 Feet


N
(Joins sheet 19)
R. 10 E.
(Joins sheet 37)
(Joins sheet 29)
T. 28 N.
FORD COUNTY
Scale 1:15 840
18
17
16
15
19
20
21
22
802
888
150B
201
151
125
153
102
330
69


29
N
(Joins sheet 20)
(Joins sheet 38)
(Joins sheet 28)
(Joins sheet 30)
R 10 E | R 11 E
Langan Creek
15
14
13
18
22
23
24
19
Scale 1 15 840
5 000 Feet

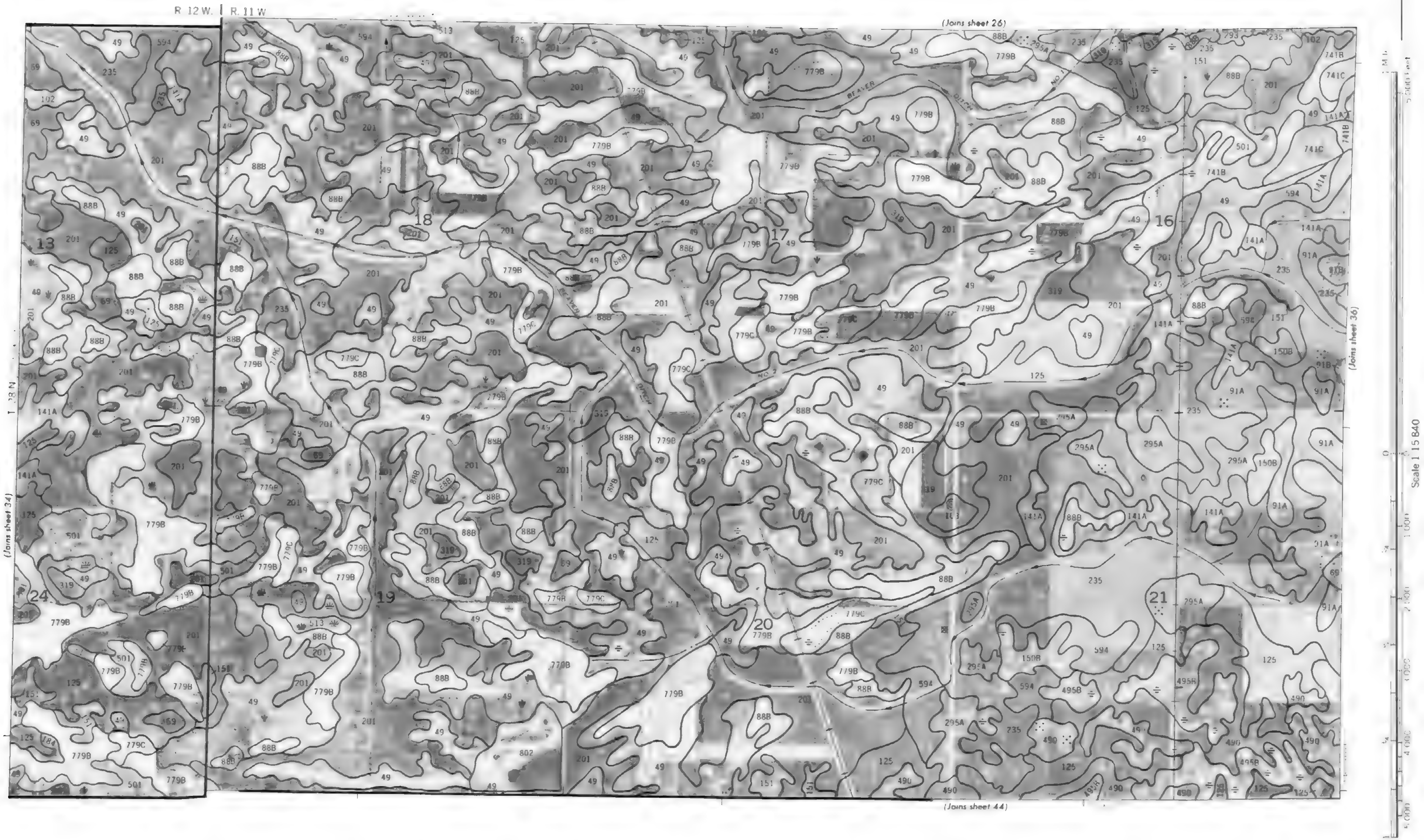

N
(Joins sheet 21)
R. 14 W.
(Joins sheet 29)
(Joins sheet 31)
(Joins sheet 39)
Scale 1:15 840
15
16
17
18
19
20
21
22
water
57
45
54
118
805


N
R. 14 W.
R. 13 W.
(Joins sheet 22)
(Joins sheet 32)
(Joins sheet 30)
(Joins sheet 40)
T. 28 N.
15
14
13
18
22
23
24
19
PRAIRIE
CREEK
Scale 1:15 840
1 Mile
5 000 Feet

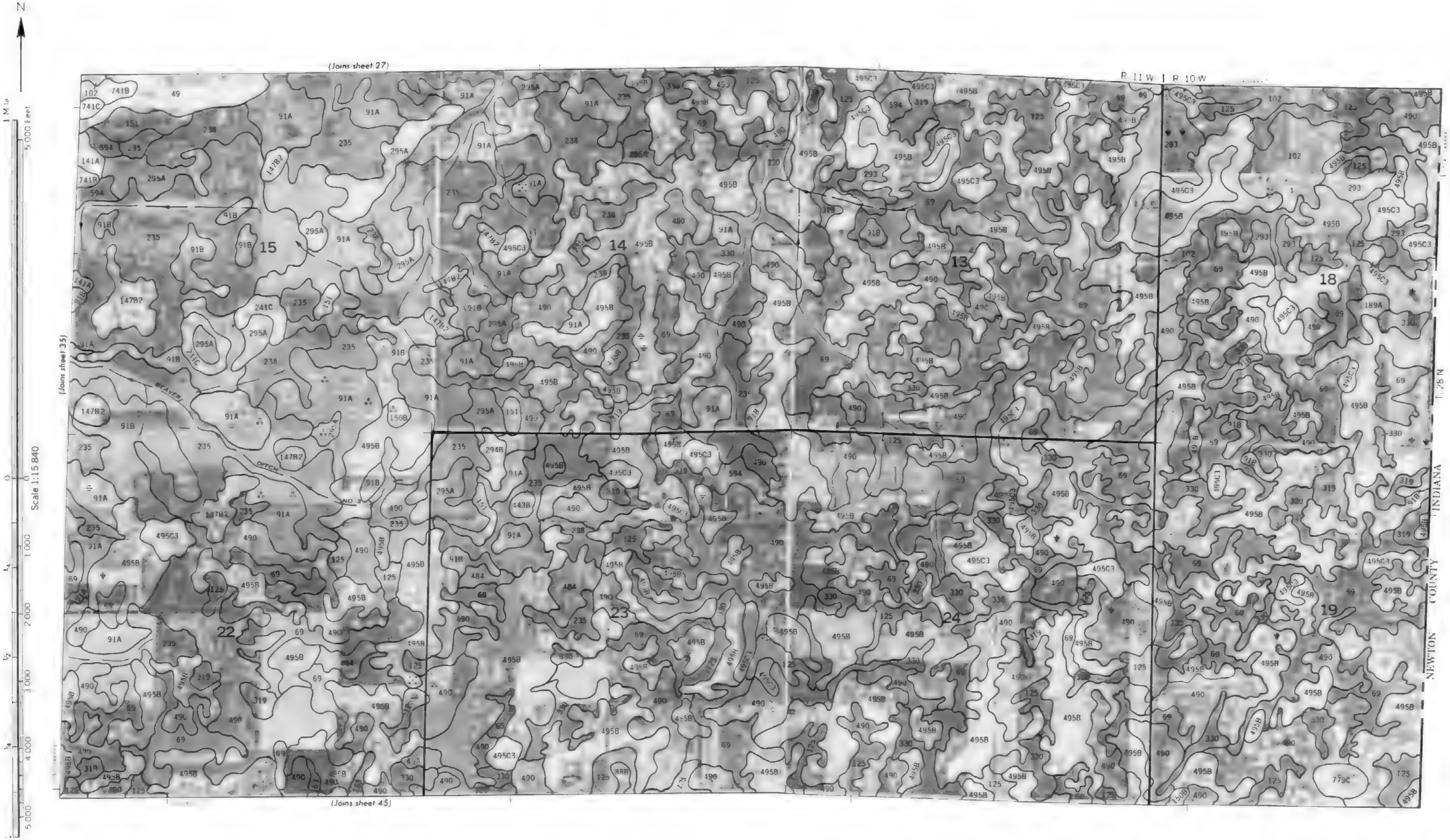

N
Scale 1:15 840
(Joins sheet 23)
R 13 W
(Joins sheet 31)
(Joins sheet 33)
(Joins sheet 41)
T 28 N
PRAIRIE CREEK
IROQUOIS RIVER
L'Erable
CEMETERY
14
15
16
17
20
21
22
23


33
N
R 13 W
R 12 W
(Joins sheet 24)
(Joins sheet 34)
(Joins sheet 42)
(Joins sheet 32)
T 28 N
Pike Creek
North Martinton Ditch
13
14
17
18
19
20
23
24
Scale 1:15 840
5 000 Feet
1 Mile


N
(Joins sheet 25)
R. 12 W.
Martinton
(Joins sheet 33)
(Joins sheet 35)
T. 28 N.
(Joins sheet 43)
Scale 1:15 840


R. 12 W.
R. 11 W.
(Joins sheet 26)
(Joins sheet 36)
(Joins sheet 44)
(Joins sheet 34)
T. 28 N.
N
Scale 1:15 840
13
16
17
18
19
20
21
24
BEAVER
DITCH
NO. 2

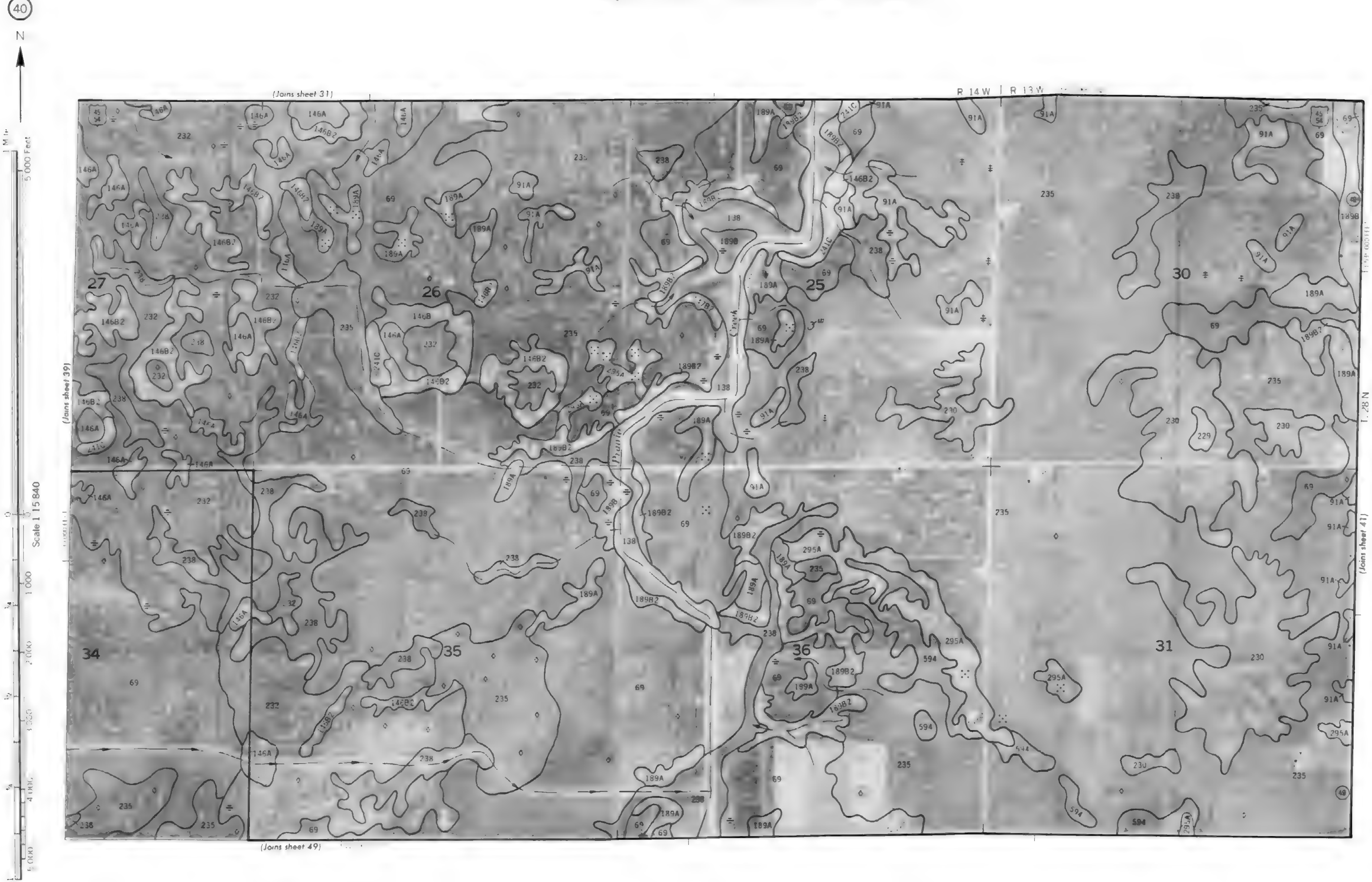
IROQUOIS COUNTY, ILLINOIS — SHEET NUMBER 36

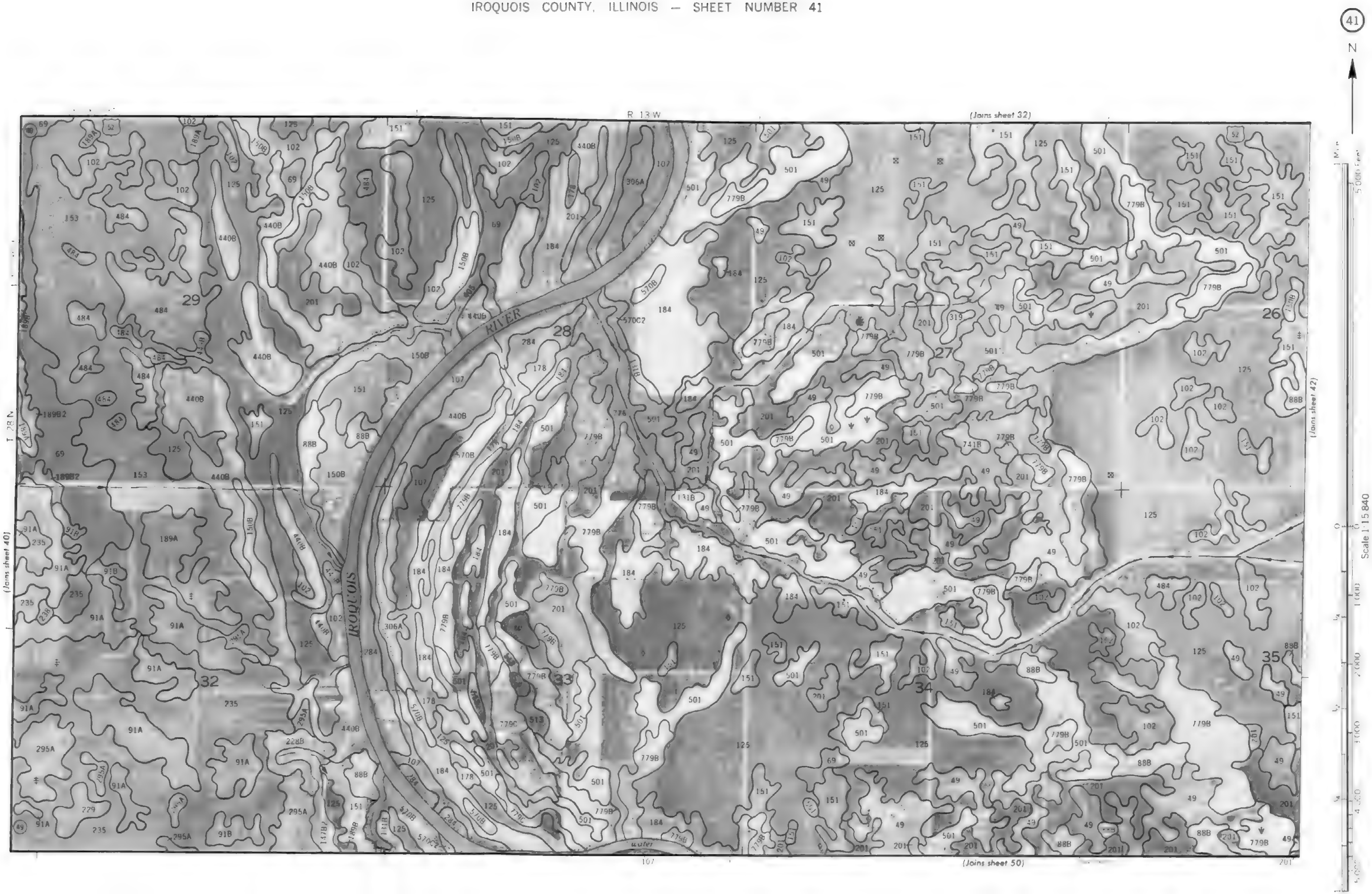


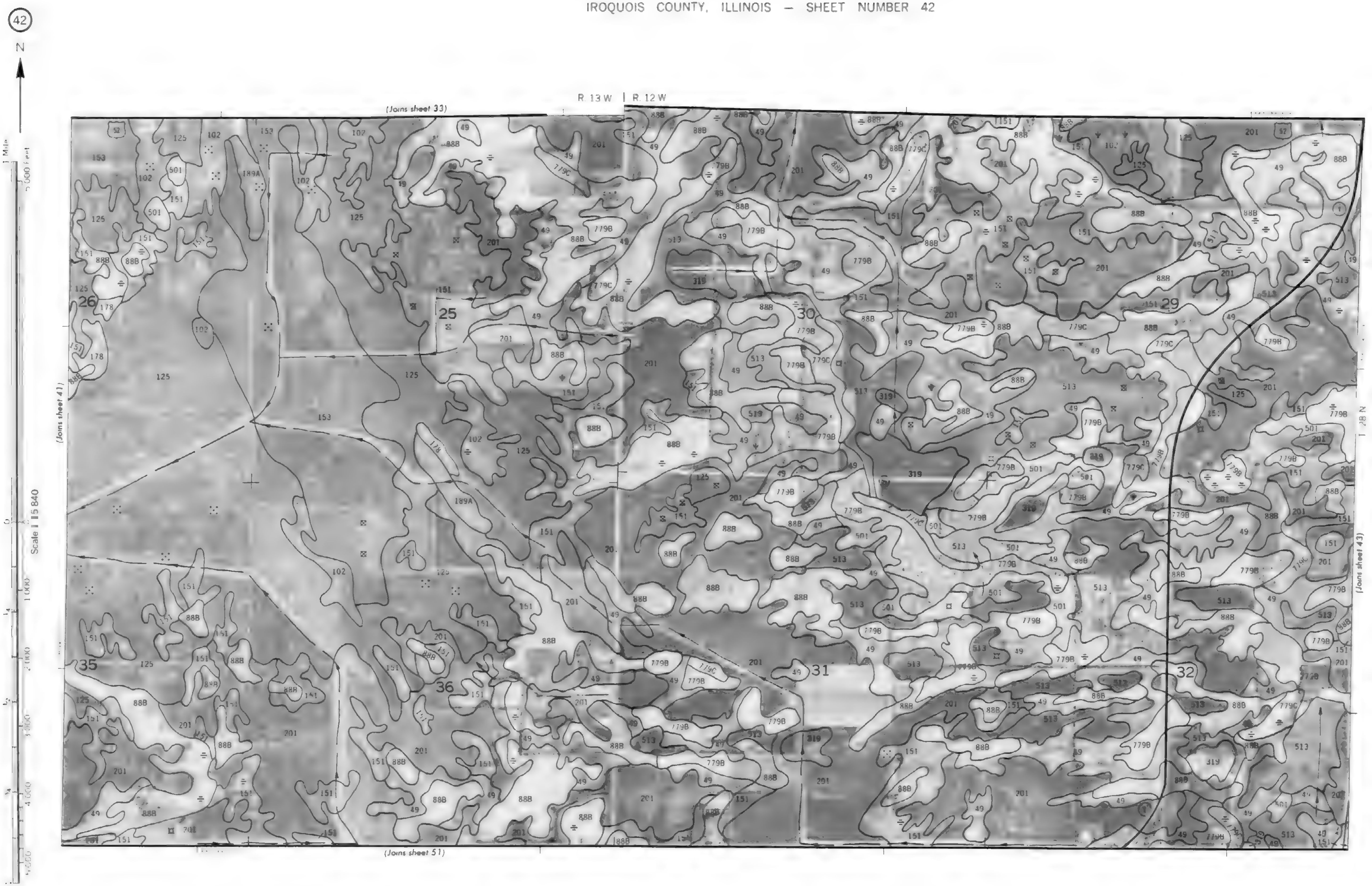

37
N
R. 10 E.
(Joins sheet 28)
(Joins sheet 38)
(Joins sheet 46)
T. 28 N.
FORD COUNTY
Scale 1:15 840
1 Mile
5000 Feet
30
29
28
27
31
32
33
34
153
151
125
150B
102
201
69
484
118

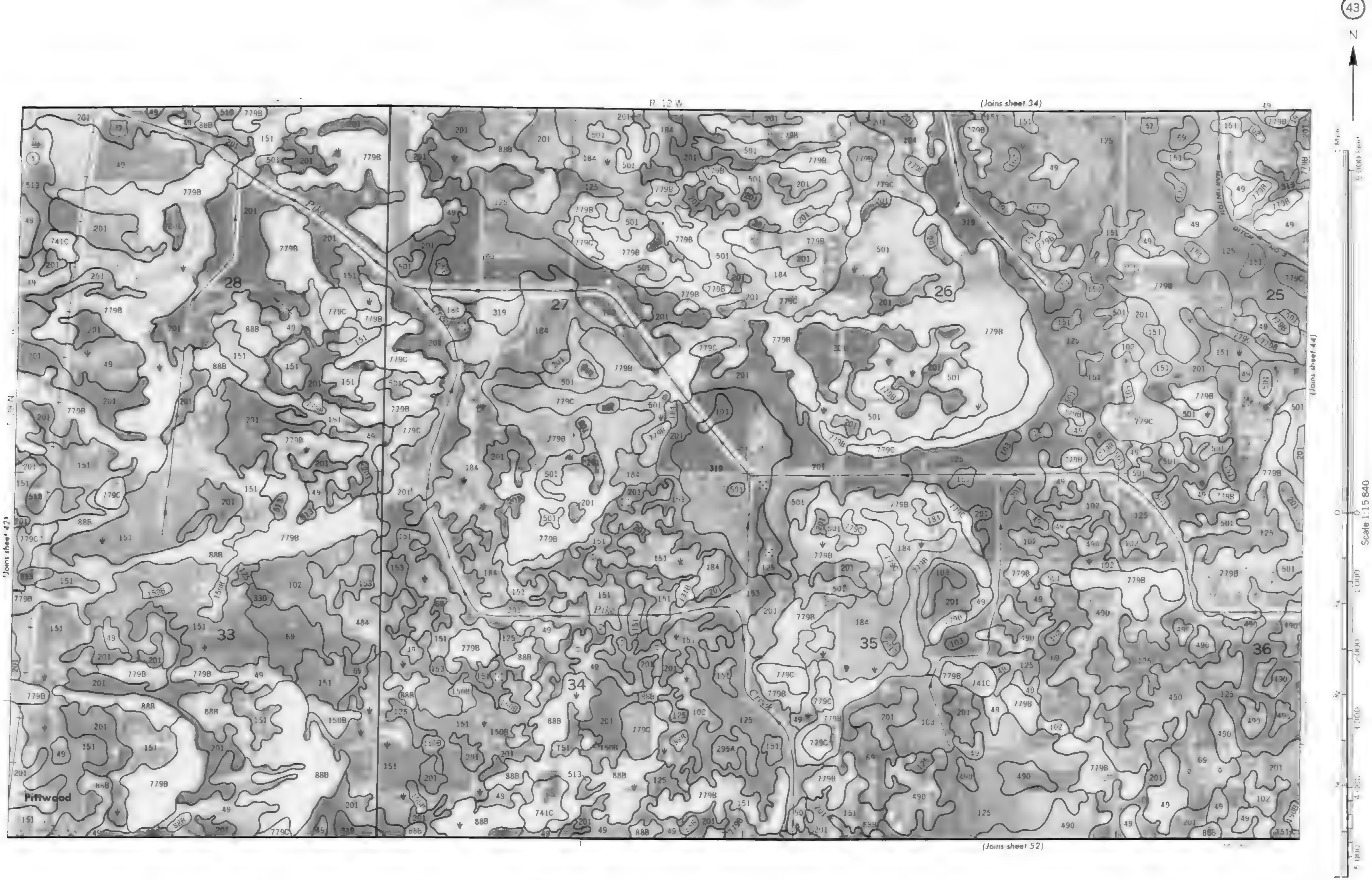

N
(Joins sheet 29)
R. 10 E. | R. 11 E.
(Joins sheet 37)
(Joins sheet 39)
(Joins sheet 47)
T. 28 N.
Scale 1:15 840
1 Mile
5 000 Feet
27
26
25
30
34
35
36
31
69
102
125
151
153
150B
189A
235
238
440B
91A

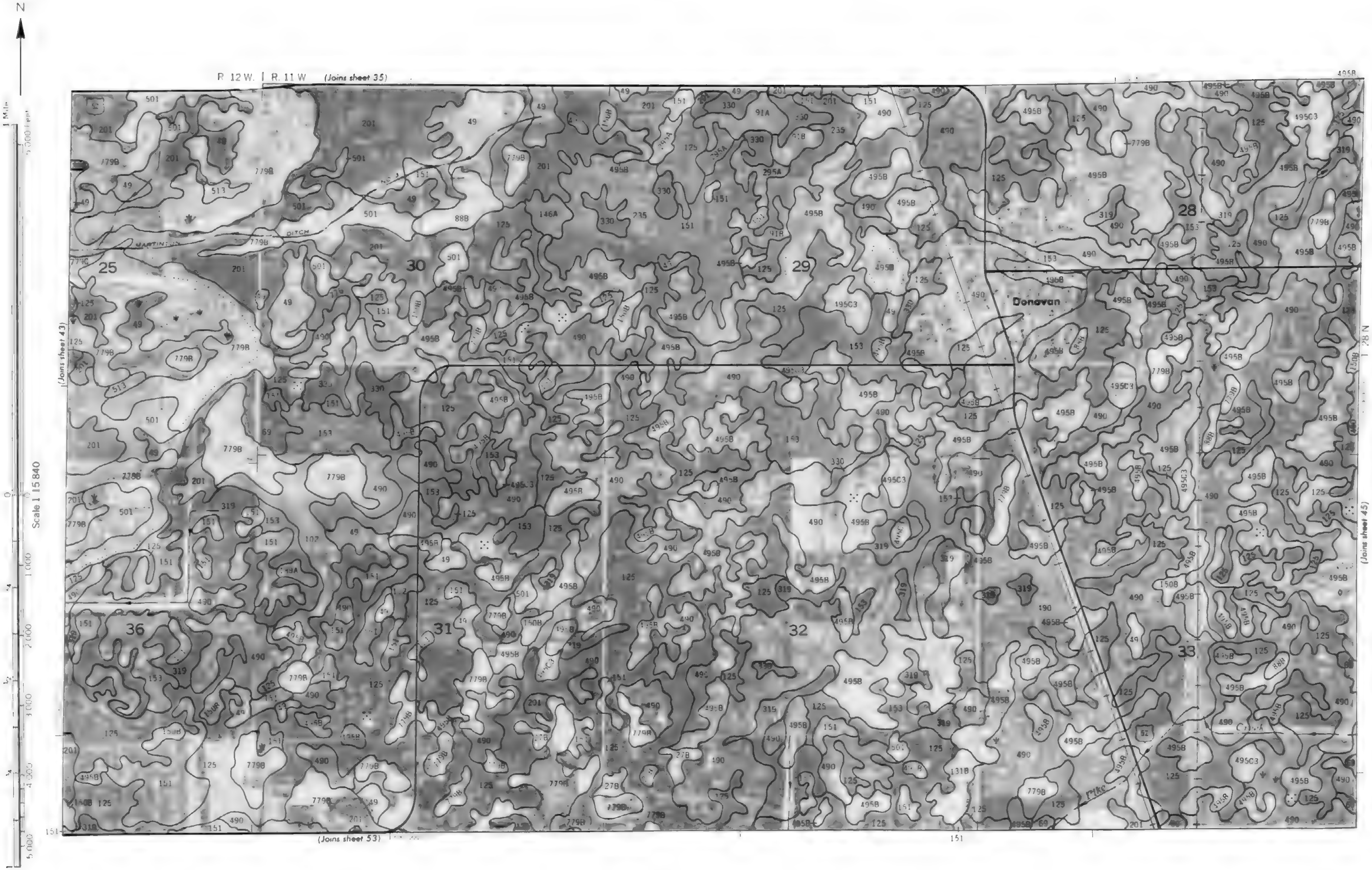

(Joins sheet 30)
(Joins sheet 38)
(Joins sheet 40)
(Joins sheet 48)
R. 14 W.
T. 28 N.
Askum
N
Scale 1:15 840
water
27
28
29
30
31
32
33
34

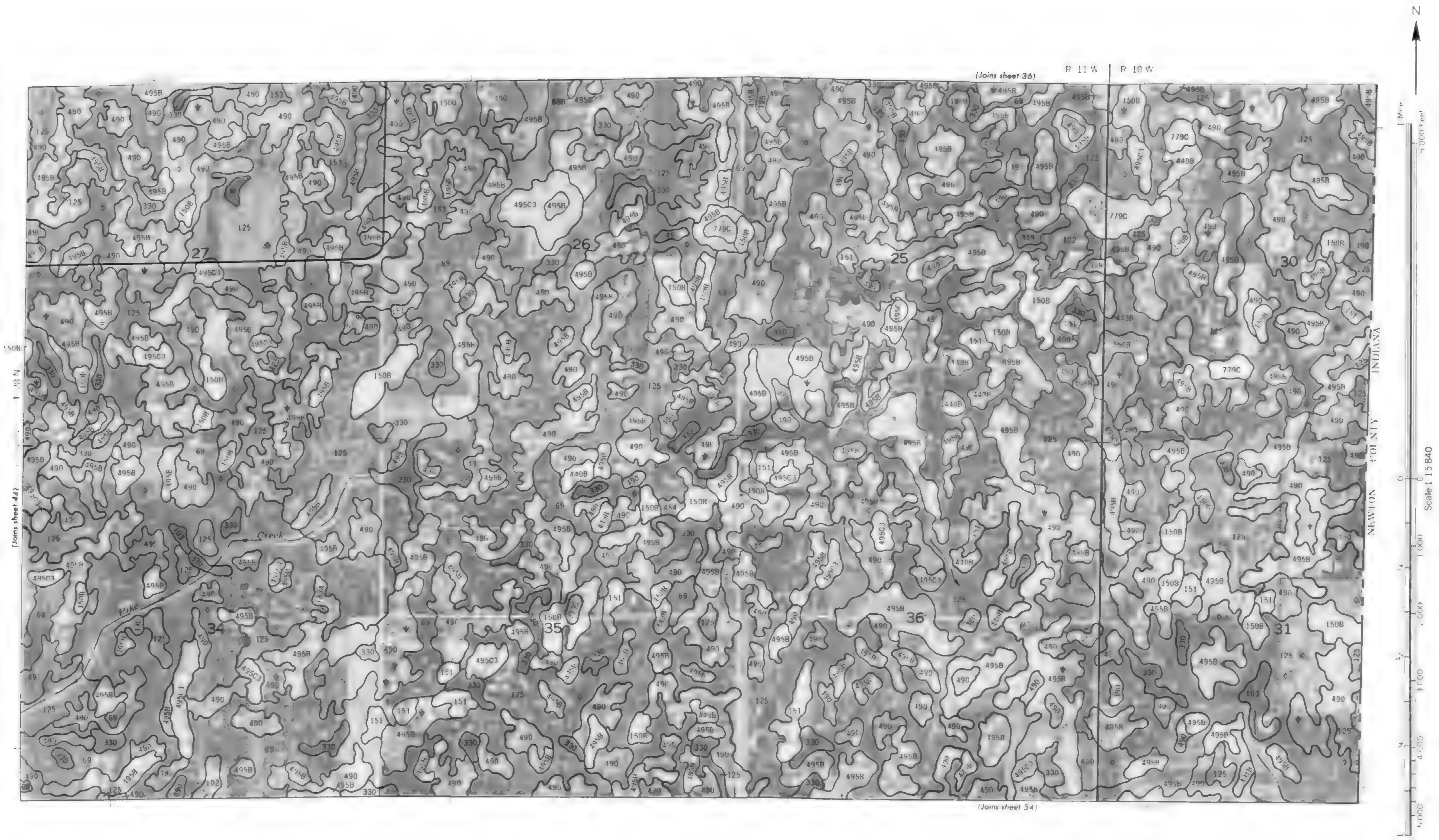

40
N
(Joins sheet 31)
(Joins sheet 39)
(Joins sheet 41)
(Joins sheet 49)
R 14 W
R 13 W
T. 28 N.
Scale 1:15 840
1 Mile
5 000 Feet
Prairie Creek
26
25
27
30
34
35
36
31


41
N
R 13 W
(Joins sheet 32)
(Joins sheet 40)
(Joins sheet 42)
(Joins sheet 50)
T 28 N
IROQUOIS
RIVER
water
29
28
27
26
32
33
34
35
Scale 1:15 840

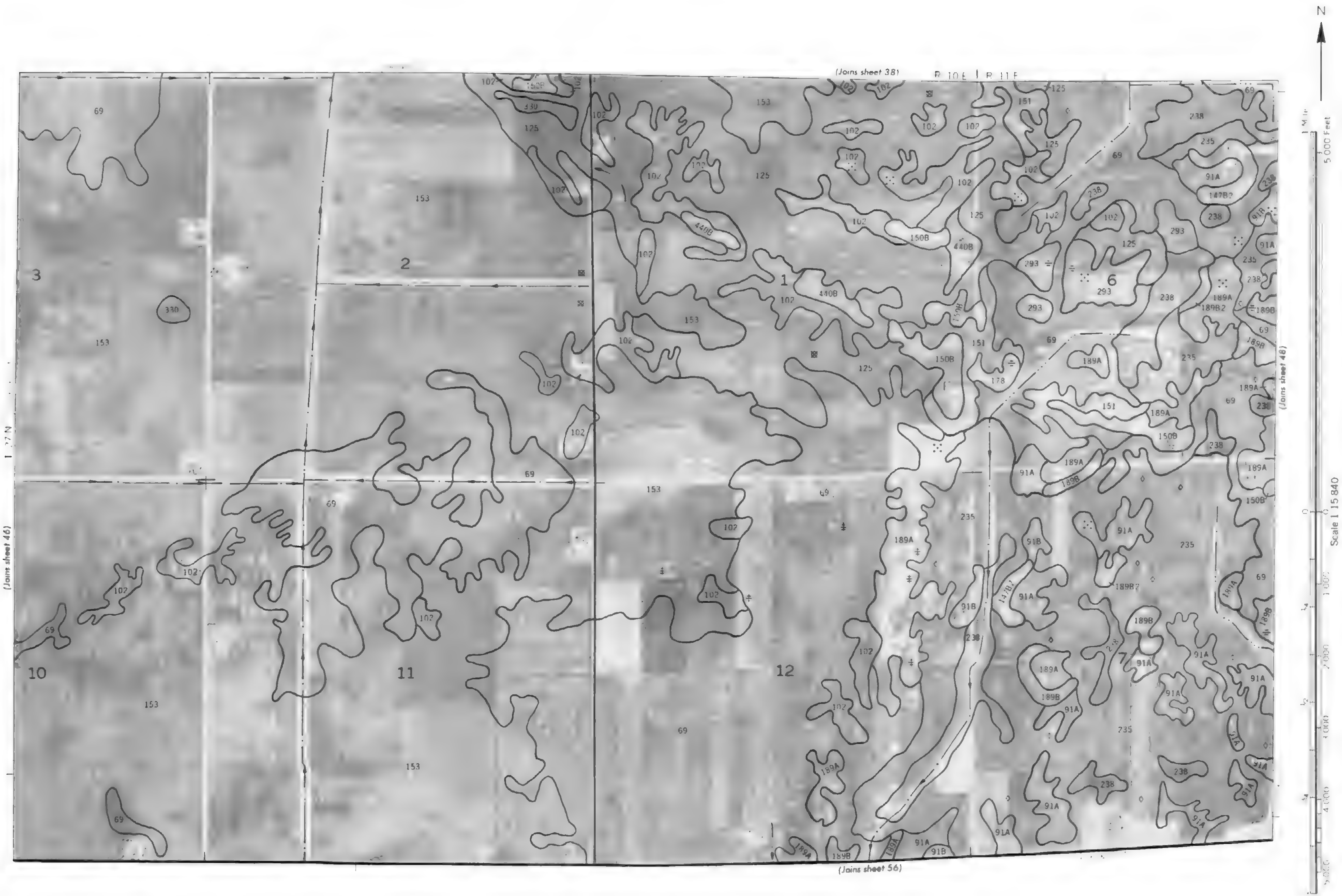

42
N
(Joins sheet 33)
R. 13 W
R. 12 W
(Joins sheet 41)
(Joins sheet 43)
T. 28 N
(Joins sheet 51)
Scale 1:15 840
1 Mile
5 000 Feet
25
26
29
30
31
32
35
36


43
N
R 12 W
(Joins sheet 34)
(Joins sheet 44)
(Joins sheet 52)
(Joins sheet 42)
T 28 N
Pike
Creek
Martinton Ditch
Pittwood
28
27
26
25
33
34
35
36
Scale 1:15 840


N
R. 12 W. | R. 11 W.
(Joins sheet 35)
(Joins sheet 43)
(Joins sheet 45)
(Joins sheet 53)
T. 28 N.
Donovan
Martinton Ditch
Creek
Pike
25
30
29
28
36
31
32
33
Scale 1:15 840
1 Mile
5000 Feet


N
(Joins sheet 36)
R 11 W
R 10 W
(Joins sheet 44)
(Joins sheet 54)
T 28 N
INDIANA
NEWTON COUNTY
Scale 1:15 840
25
26
27
30
31
34
35
36
Pike
Creek


46
N
(Joins sheet 37)
R. 10 E.
(Joins sheet 55)
(Joins sheet 47)
T. 27 N.
FORD COUNTY
1 Mile
5 000 Feet
Scale 1:15 840
1 000
2 000
3 000
4 000
5 000
6
5
4
3
7
8
9
10
153
69
102
330
238
151
150B


N
(Joins sheet 38)
R 10 E | R 11 E
(Joins sheet 46)
(Joins sheet 48)
(Joins sheet 56)
5 000 Feet
Scale 1:15 840
1
2
3
6
7
10
11
12


N
(Joins sheet 39)
R. 14 W.
(Joins sheet 47)
(Joins sheet 49)
(Joins sheet 57)
T. 27 N.
Scale 1:15 840
1 Mile
5 000 Feet
Danforth
Prairie Creek
1
2
3
4
5
6
7
8
9
10


49
N
R. 14 W.
R. 13 W.
(Joins sheet 40)
(Joins sheet 50)
(Joins sheet 58)
(Joins sheet 48)
T. 27 N.
Prairie
Creek
Scale 1:15 840
5 000 Feet
1 Mile
2
3
6
7
10
11
12

(50)

N

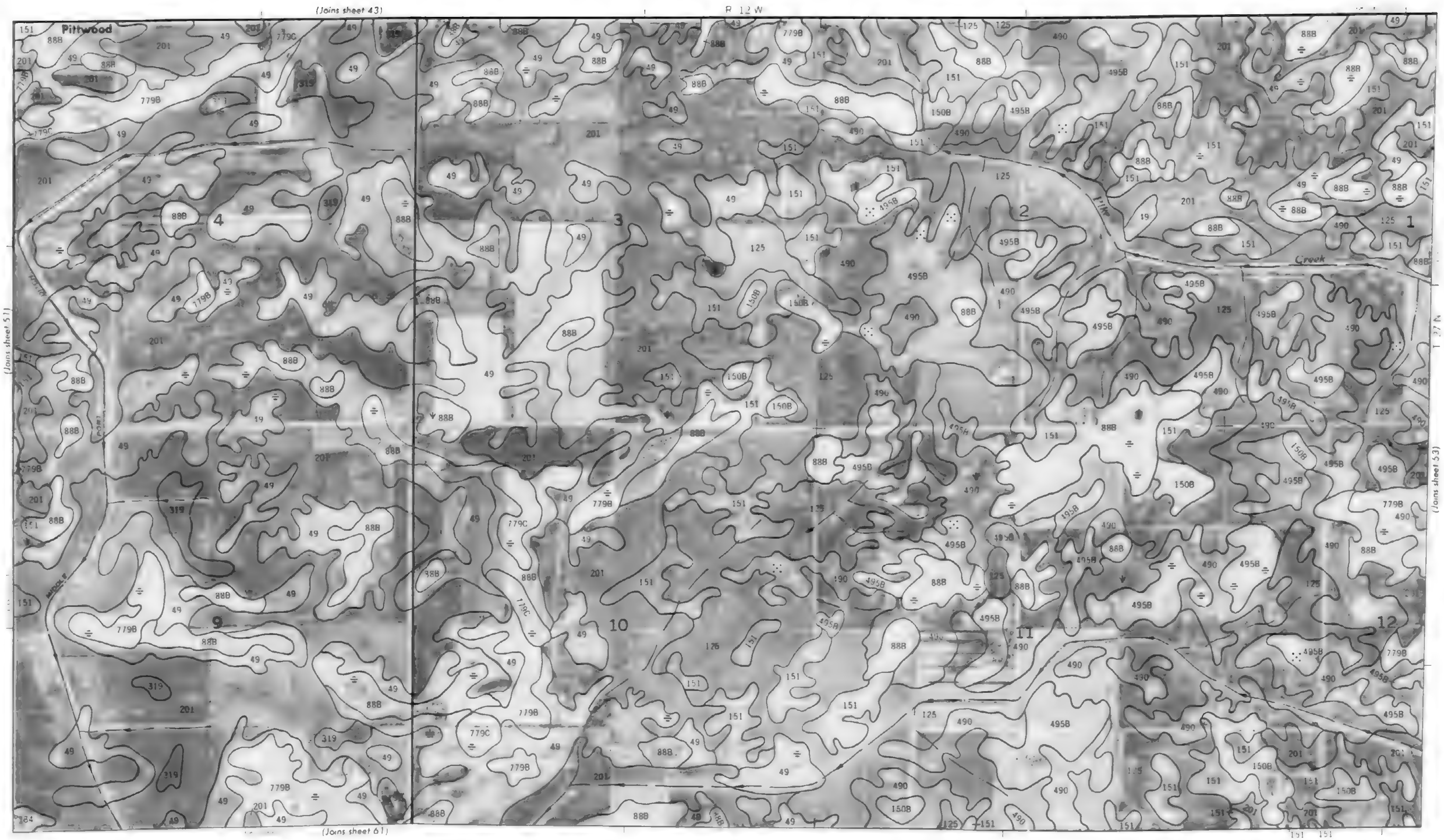
Scale 1:15 840


51
N
(Joins sheet 42)
R 13 W | R 12 W
(Joins sheet 52)
(Joins sheet 50)
(Joins sheet 60)
T 27 N
Scale 1:15 840

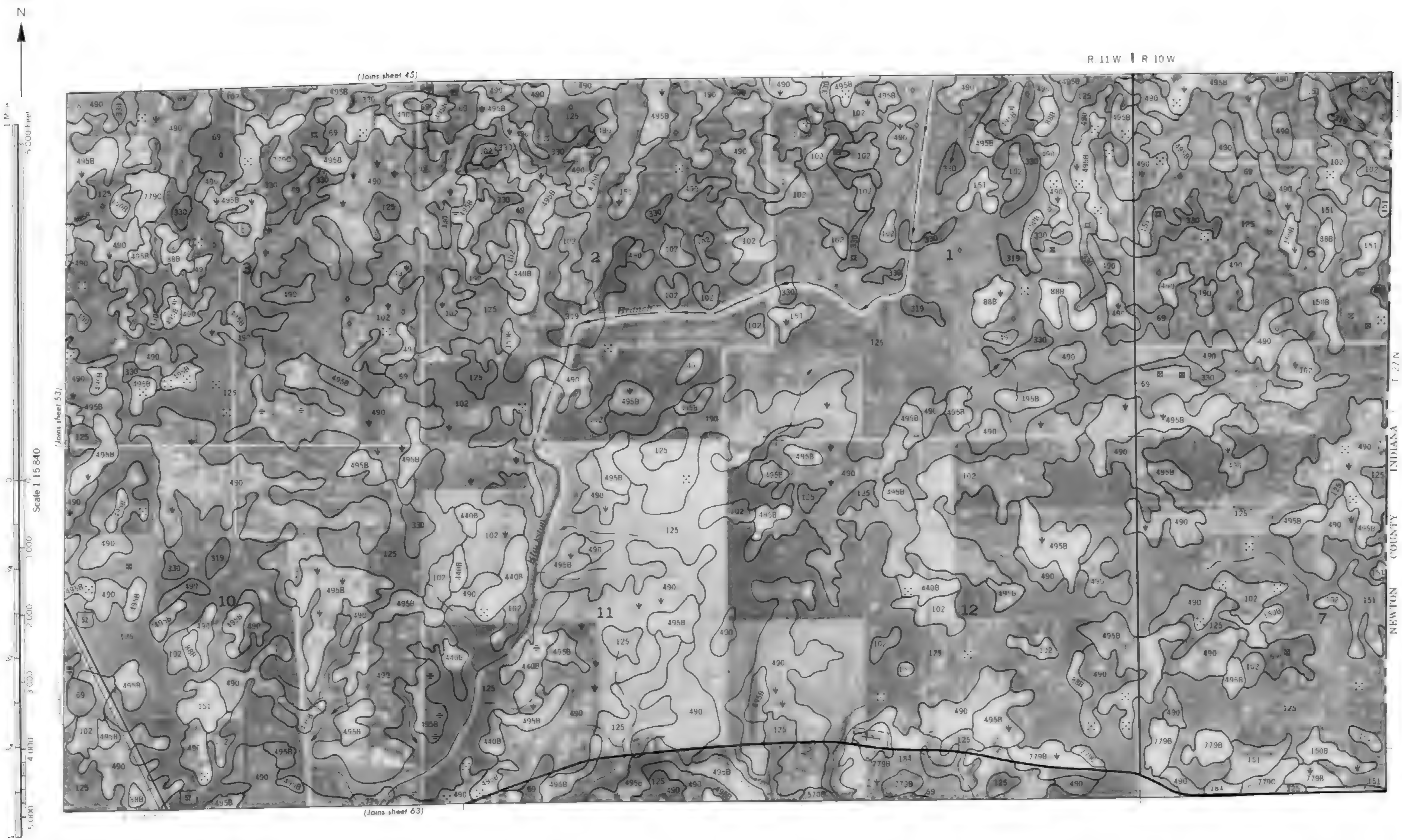
52

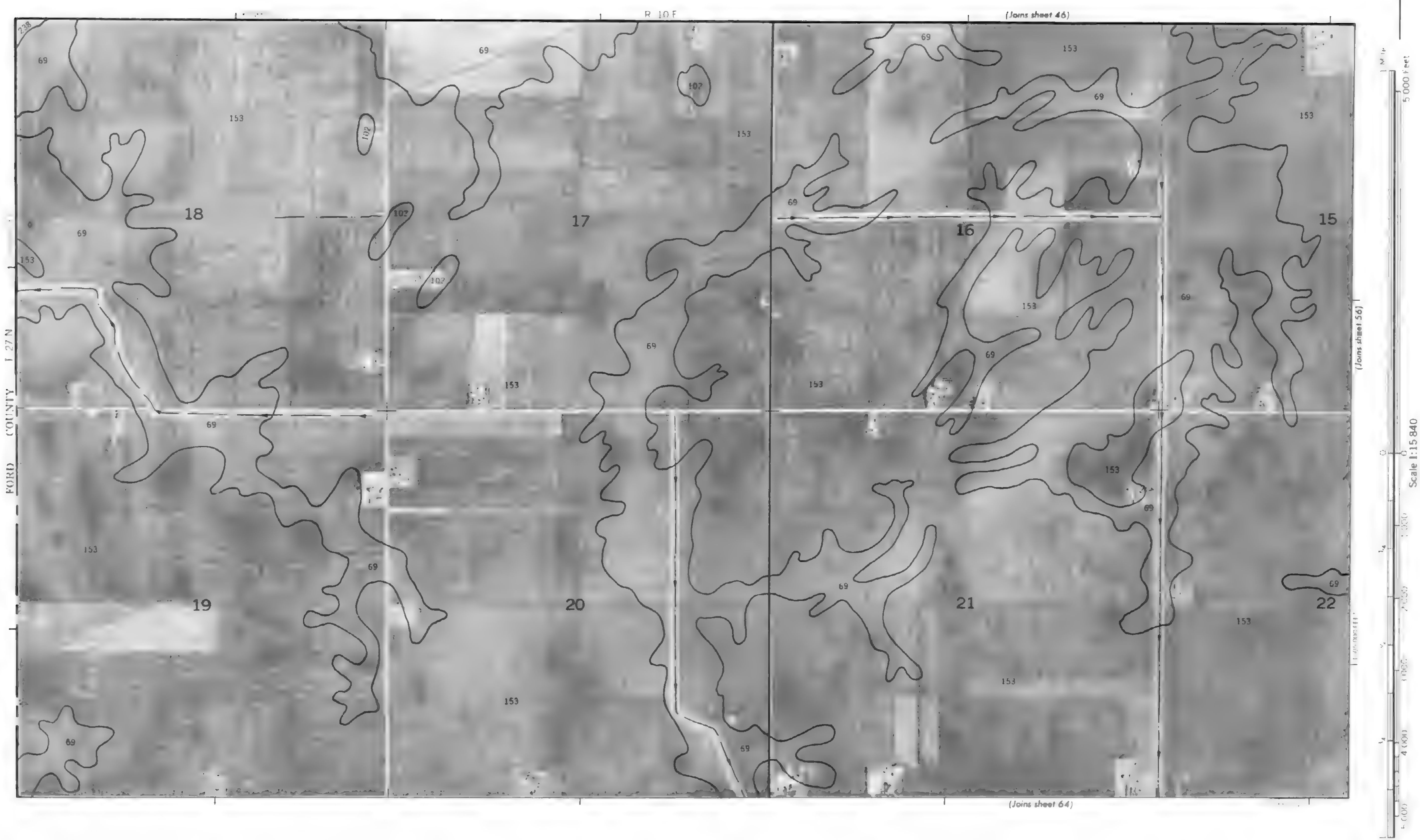
N

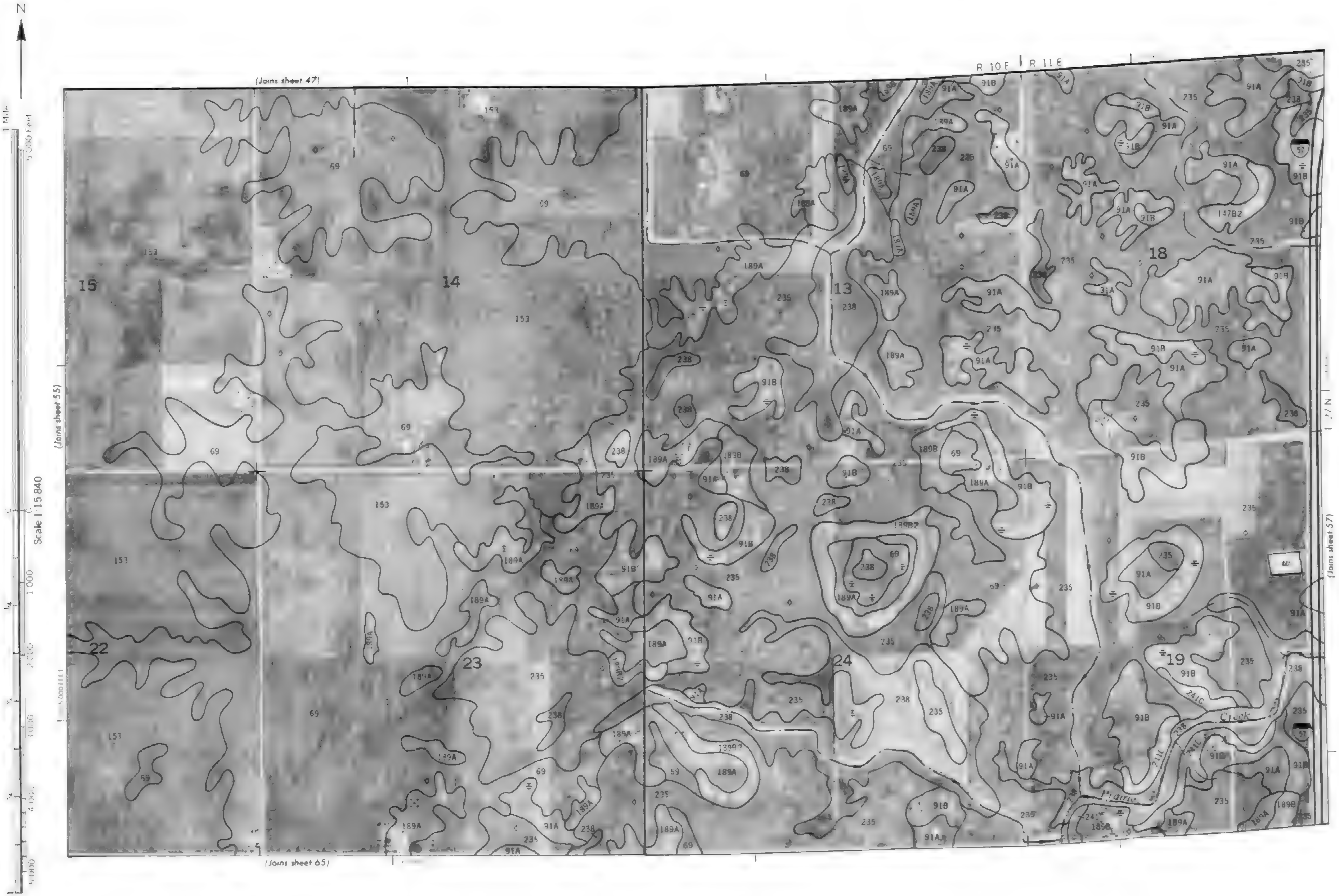
Scale 1:15 840




53
N
(Joins sheet 44)
R 12 W | R 11 W
(Joins sheet 54)
(Joins sheet 52)
(Joins sheet 62)
Scale 1:15 840
1 Mile
5000 Feet
Pike
Creek
1
4
5
6
7
8
9
12


N
Scale 1:15 840
(Joins sheet 45)
(Joins sheet 53)
(Joins sheet 63)
R 11 W
R 10 W
T 27 N
INDIANA
NEWTON COUNTY
Branch

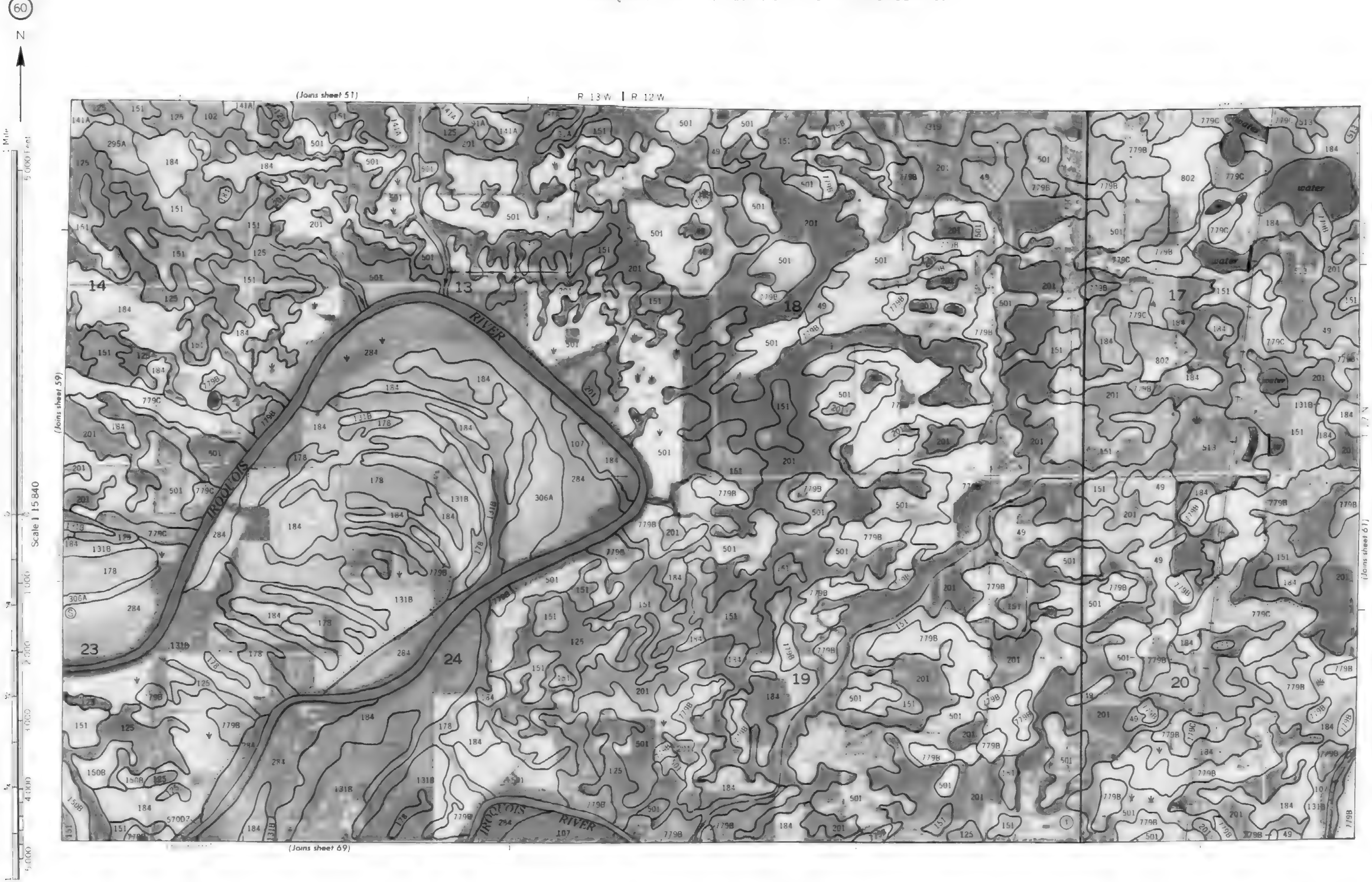

55
N
R. 10 E.
(Joins sheet 46)
(Joins sheet 56)
(Joins sheet 64)
T. 27 N.
FORD COUNTY
18
17
16
15
19
20
21
22
69
153
102
238
5 000 Feet
1 Mile
Scale 1:15 840


N
Scale 1:15 840
(Joins sheet 47)
(Joins sheet 55)
(Joins sheet 57)
(Joins sheet 65)
R 10 E
R 11 E
15
14
13
18
22
23
24
19
Prairie
Creek
57


N
R. 14 W.
(Joins sheet 48)
(Joins sheet 58)
(Joins sheet 66)
(Joins sheet 56)
Danforth
Prairie Creek
Prairie Creek
15
16
17
18
19
20
21
22
Scale 1:15 840
5000 Feet
1 Mile
0

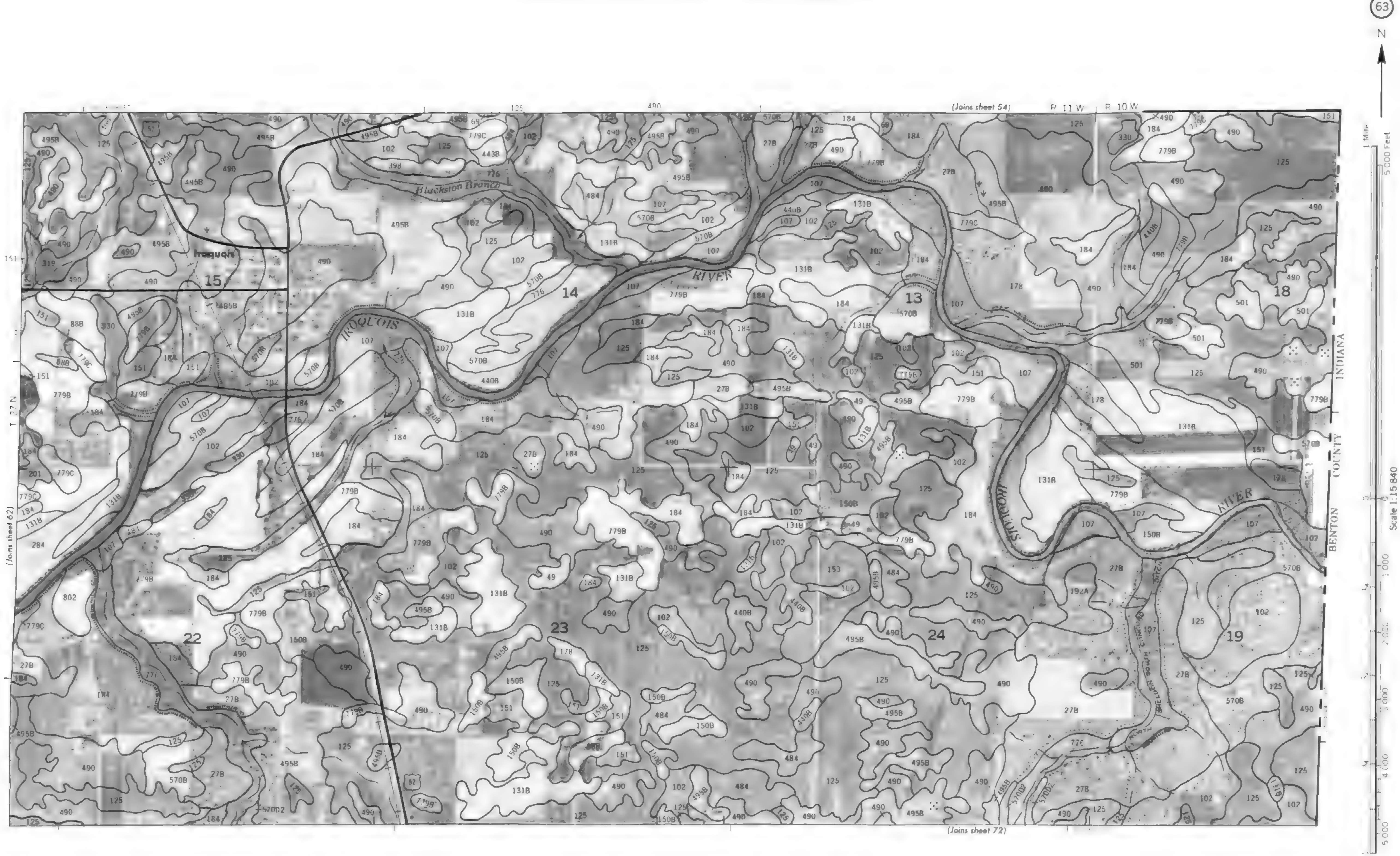

N
R. 14 W.
R. 13 W.
(Joins sheet 49)
(Joins sheet 57)
(Joins sheet 59)
(Joins sheet 67)
T. 27 N.
Scale 1:15 840
1 Mile
5 000 Feet
15
14
13
18
22
23
24
19

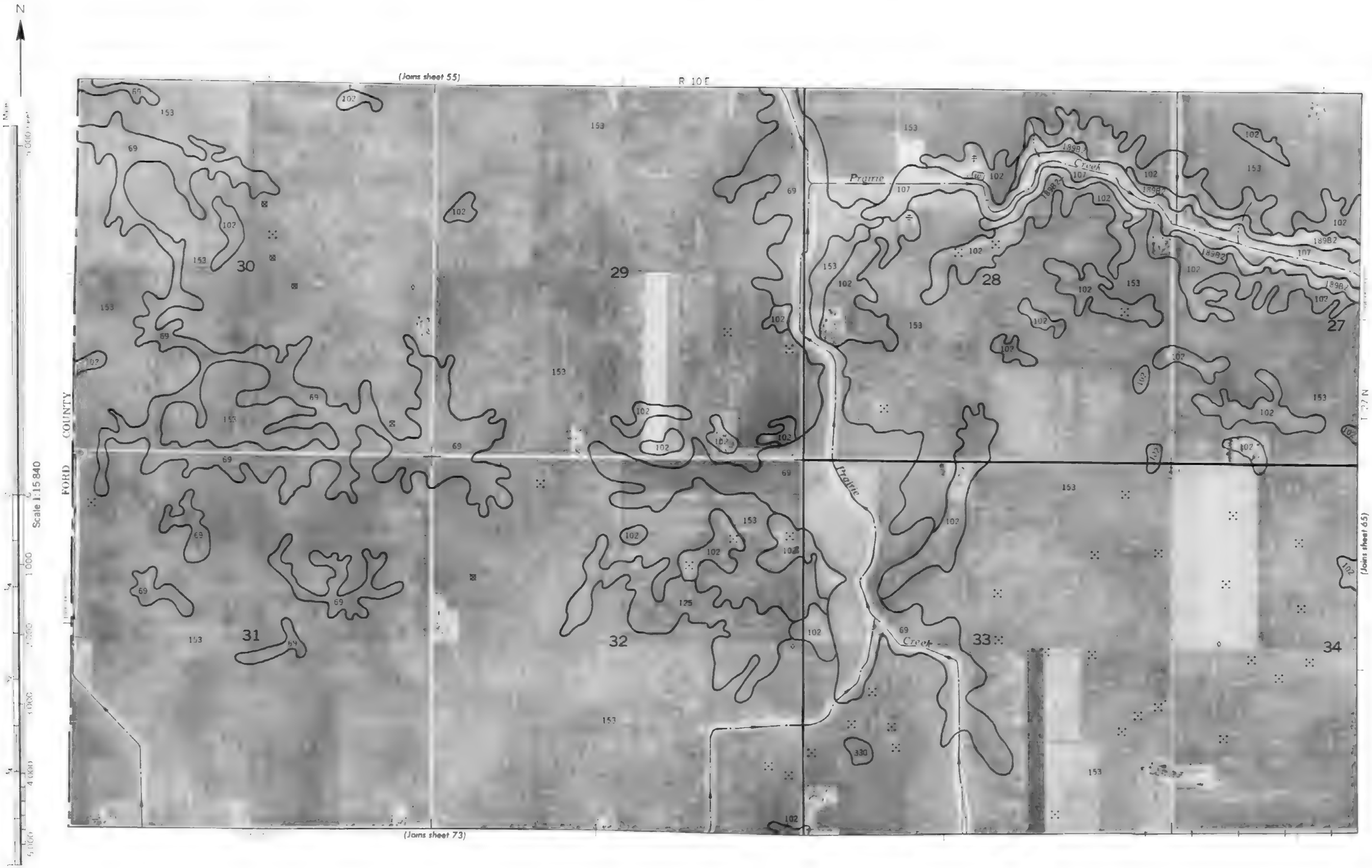

N
(Joins sheet 50)
(Joins sheet 58)
(Joins sheet 60)
(Joins sheet 68)
R. 13 W.
T. 27 N.
IROQUOIS
RIVER
Spring
Creek
Scale 1:15 840
Mile
Feet

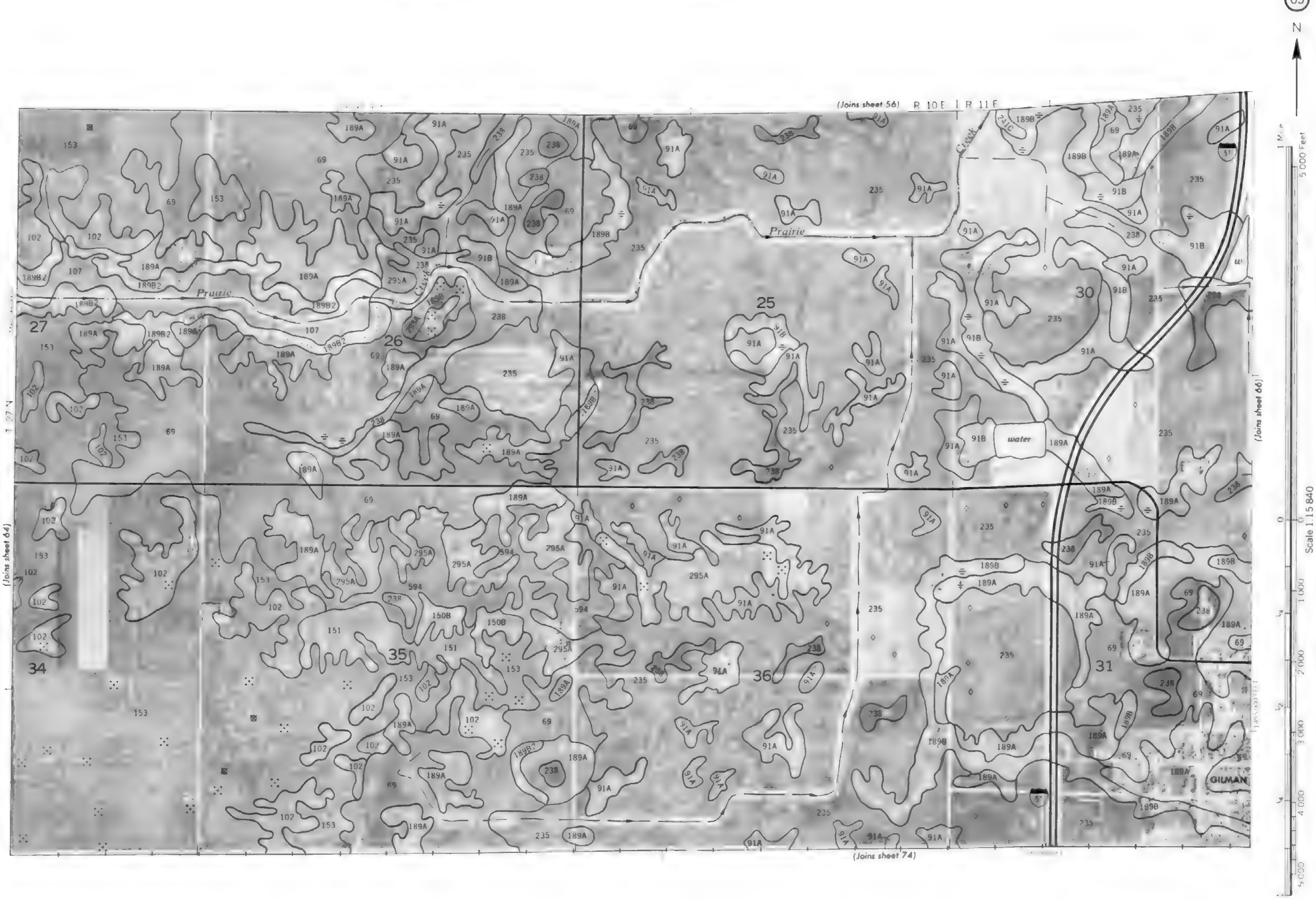

60
N
1 Mile
5 000 Feet
Scale 1:15 840
(Joins sheet 51)
R 13 W | R 12 W
(Joins sheet 59)
(Joins sheet 61)
(Joins sheet 69)
IROQUOIS
RIVER
IROQUOIS RIVER
13
14
17
18
19
20
23
24
water


N
(Joins sheet 52)
R. 12 W.
T. 27 N.
(Joins sheet 60)
(Joins sheet 62)
(Joins sheet 70)
16
15
14
13
21
22
23
24
Scale 1:15 840
1 Mile
5 000 Feet
0
1000
2000
3000
4000
5000


N
R 12 W | R 11 W
(Joins sheet 53)
(Joins sheet 61)
(Joins sheet 63)
(Joins sheet 71)
T 27 N
13
18
17
16
24
19
20
21
CEMETERY
IROQUOIS RIVER
Scale 1:15 840
1 Mile
5 000 Feet


63
N
(Joins sheet 54)
R. 11 W. | R. 10 W.
(Joins sheet 62)
(Joins sheet 72)
T. 27 N.
Iroquois
Blackston Branch
IROQUOIS RIVER
IROQUOIS RIVER
NORTH BRANCH
INDIANA
BENTON COUNTY
15
14
13
18
22
23
24
19
1 Mile
5 000 Feet
Scale 1:15 840
1 000
2 000
3 000
4 000
5 000


N
Scale 1:15 840
(Joins sheet 55)
R 10 E
FORD COUNTY
T 27 N
(Joins sheet 65)
(Joins sheet 73)
Prairie Creek
Prairie
Creek
27
28
29
30
31
32
33
34
69
102
107
125
153
189B2
330


65
N
(Joins sheet 56)
R 10 E
R 11 E
(Joins sheet 64)
(Joins sheet 66)
(Joins sheet 74)
Prairie
Creek
water
GILMAN
25
26
27
30
31
34
35
36
Scale 1:15 840
5 000 Feet
1 Mile

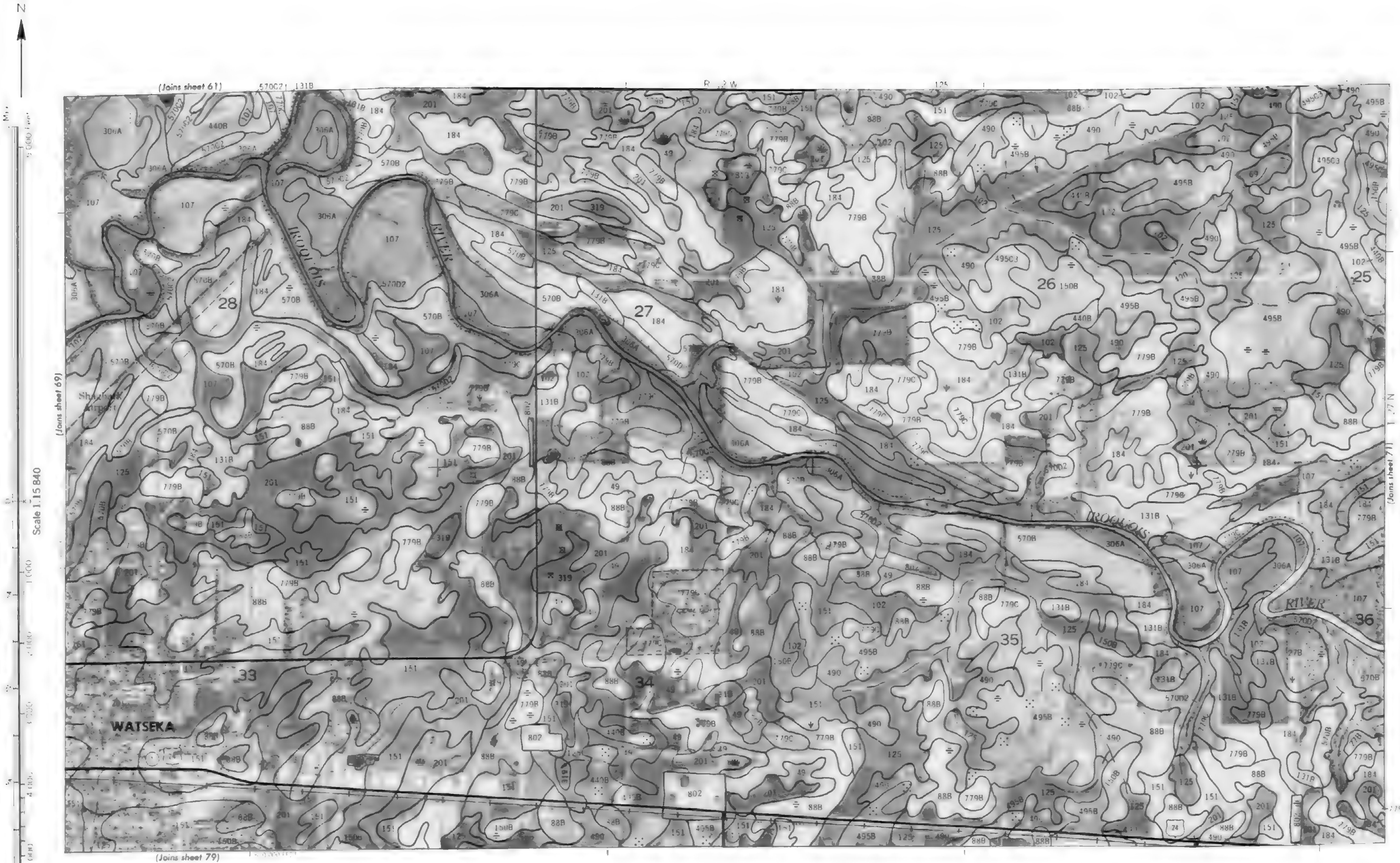

N
(Joins sheet 57)
R 14 W
(Joins sheet 65)
(Joins sheet 67)
(Joins sheet 75)
Scale 1:15 840
5 000 Feet
GILMAN
27
28
29
30
31
32
33
34
235
238
69
91A
189A
189B
805

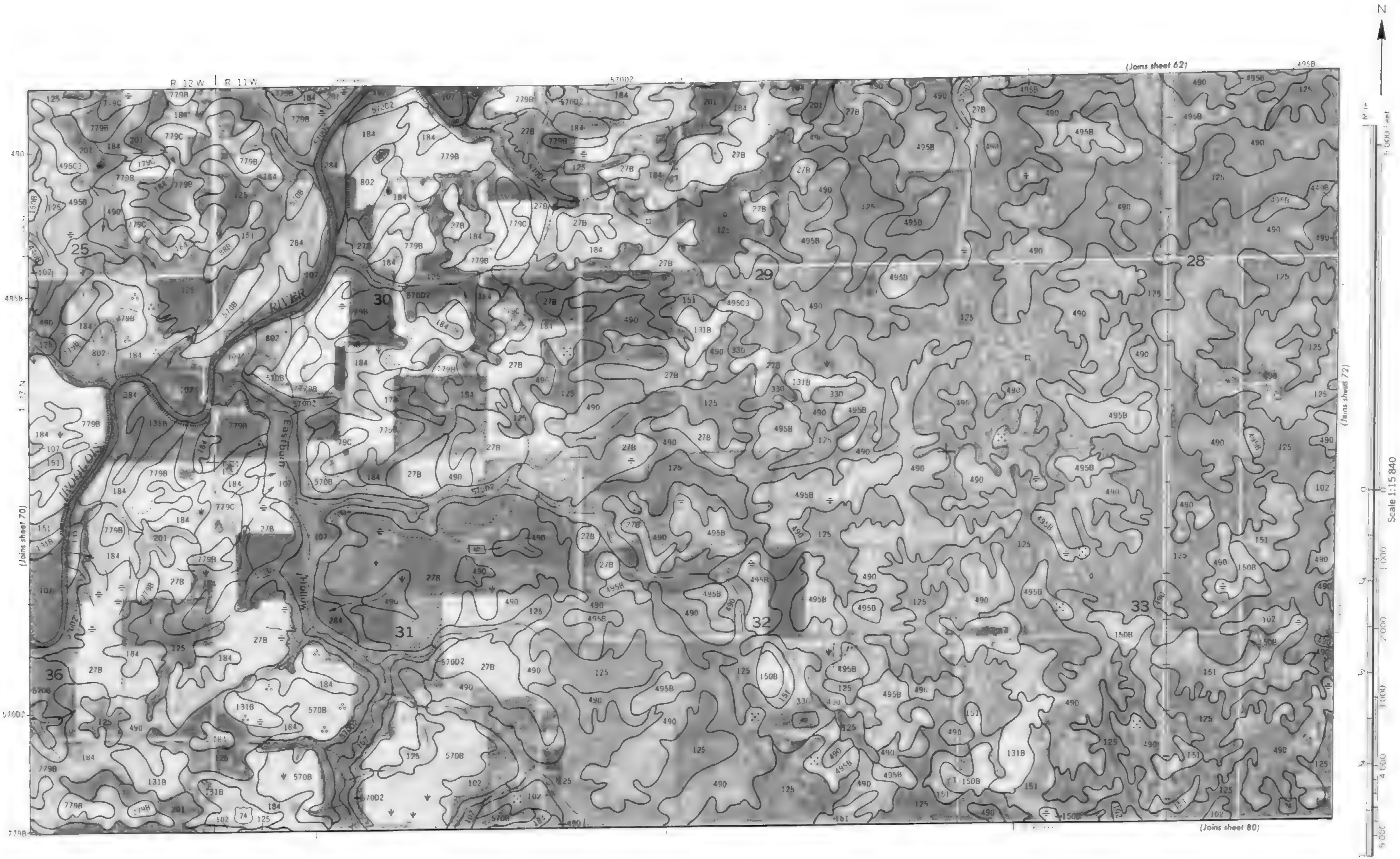

N
(Joins sheet 58)
(Joins sheet 68)
(Joins sheet 76)
(Joins sheet 66)
R. 14 W.
T. 27 N.
26
25
27
30
34
35
36
31
Spring
Spring
Creek
Scale 1:15 840
Mile
Feet

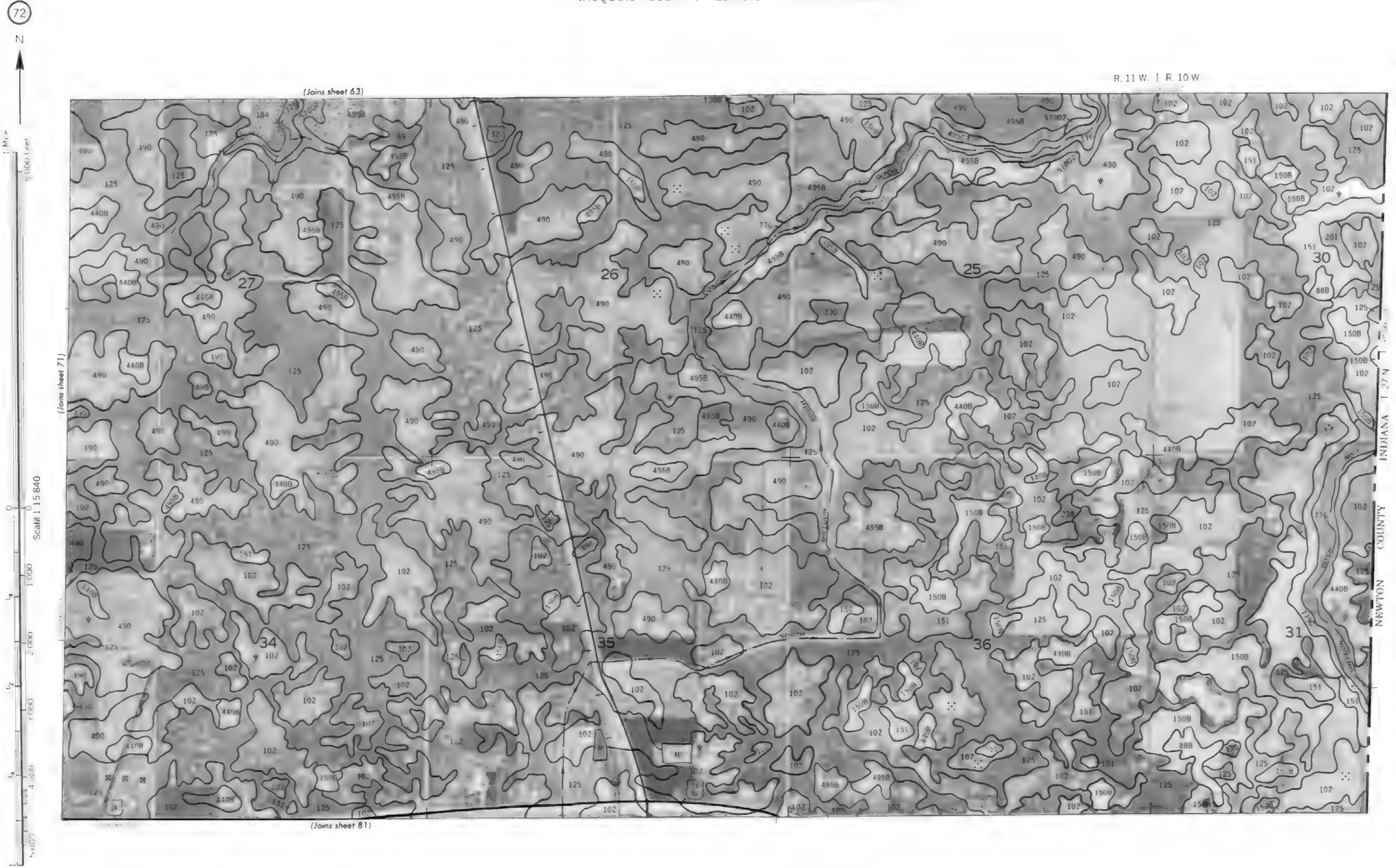
68

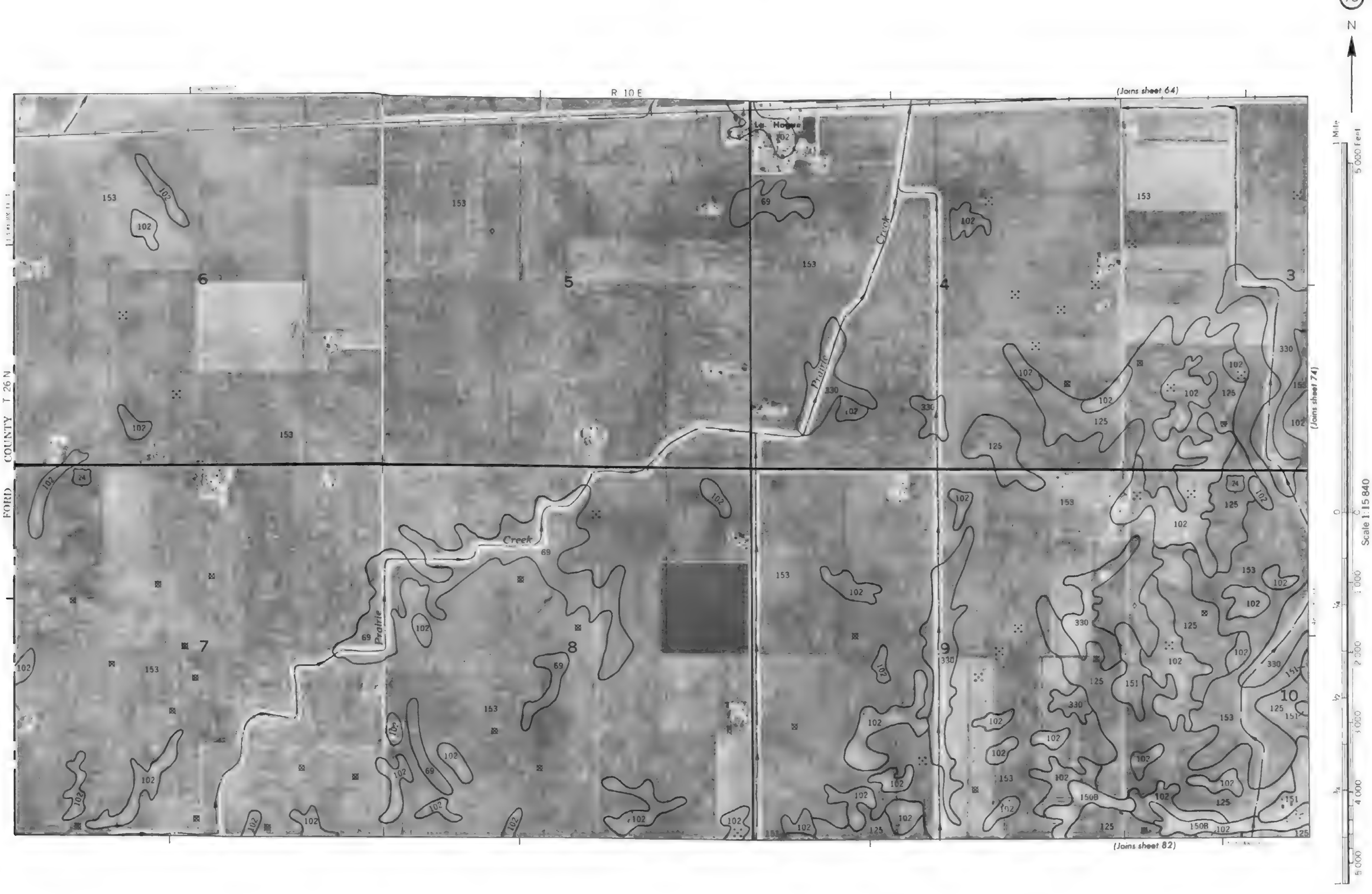

N
Scale 1:15 840
(Joins sheet 59)
(Joins sheet 67)
(Joins sheet 69)
(Joins sheet 77)
Crescent City
29
28
27
26
32
33
34
35

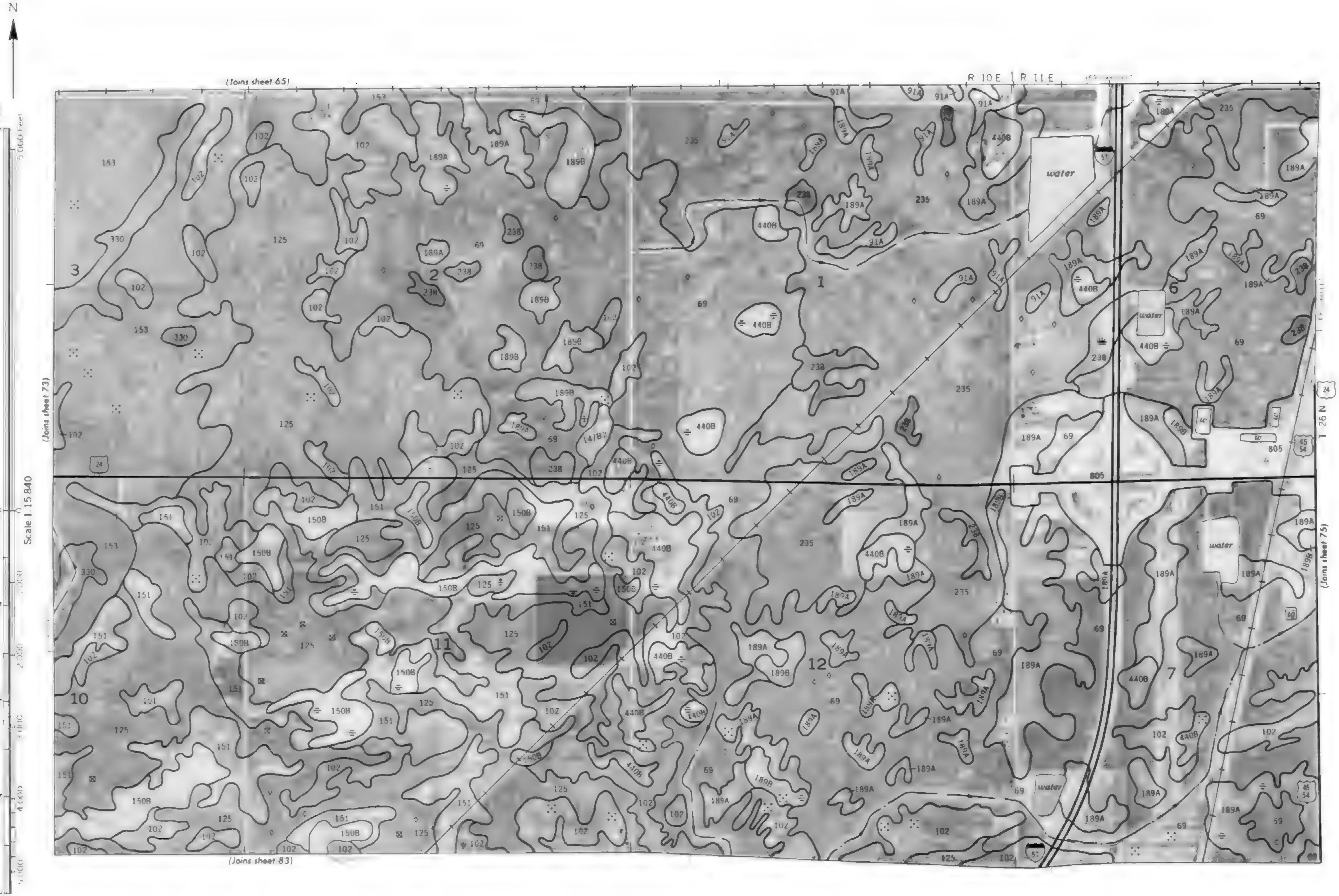

N
R. 13 W. | R. 12 W.
(Joins sheet 60)
(Joins sheet 68)
(Joins sheet 70)
(Joins sheet 78)
IROQUOIS
RIVER
IROQUOIS
RIVER
SUGAR
CREEK
WATSEKA
(county seat)
25
26
29
30
31
32
35
36
Scale 1:15 840

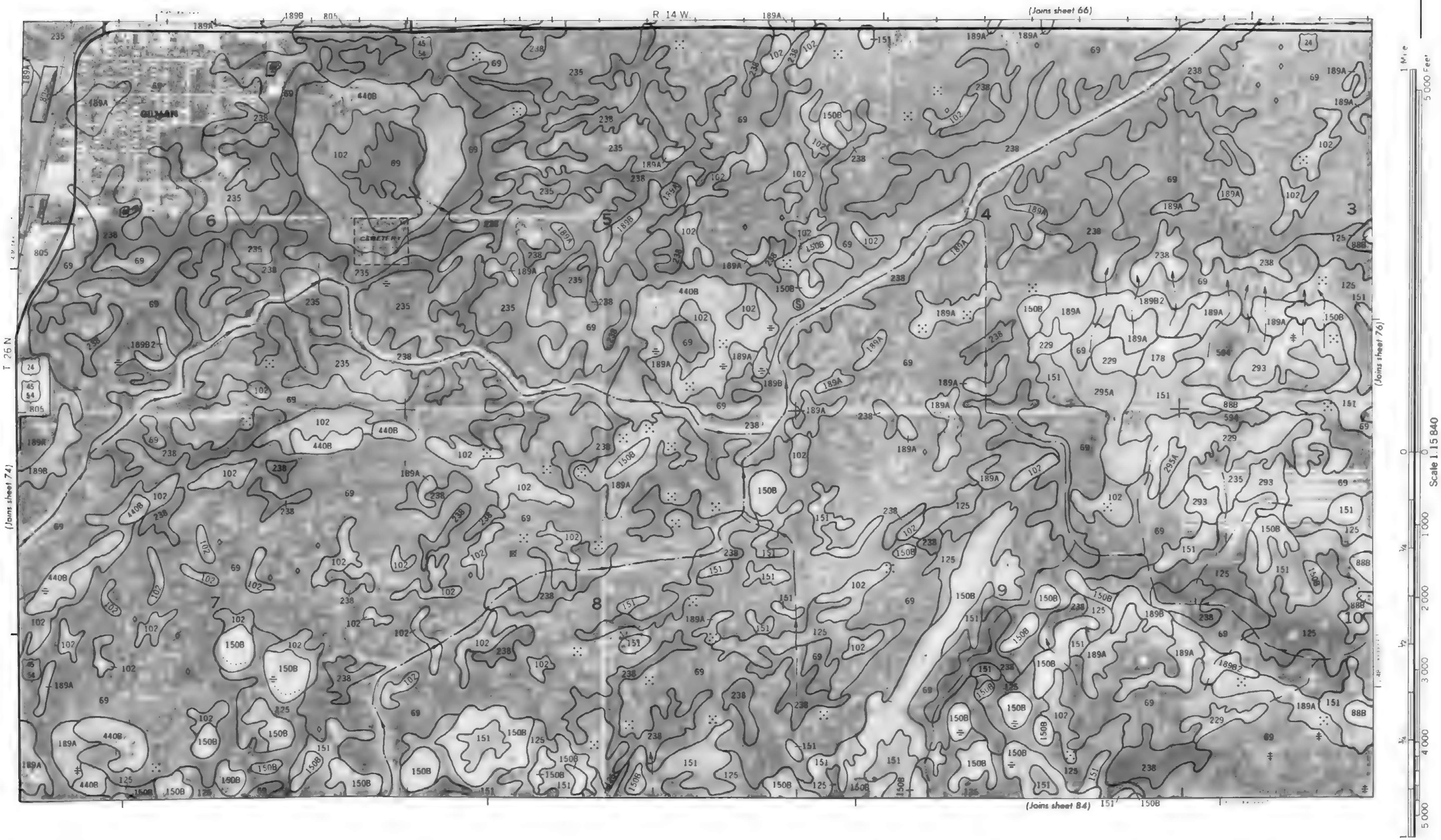

N
(Joins sheet 61)
(Joins sheet 69)
(Joins sheet 71)
(Joins sheet 79)
Scale 1:15 840
IROQUOIS
RIVER
IROQUOIS
RIVER
WATSEKA
28
27
26
25
33
34
35
36

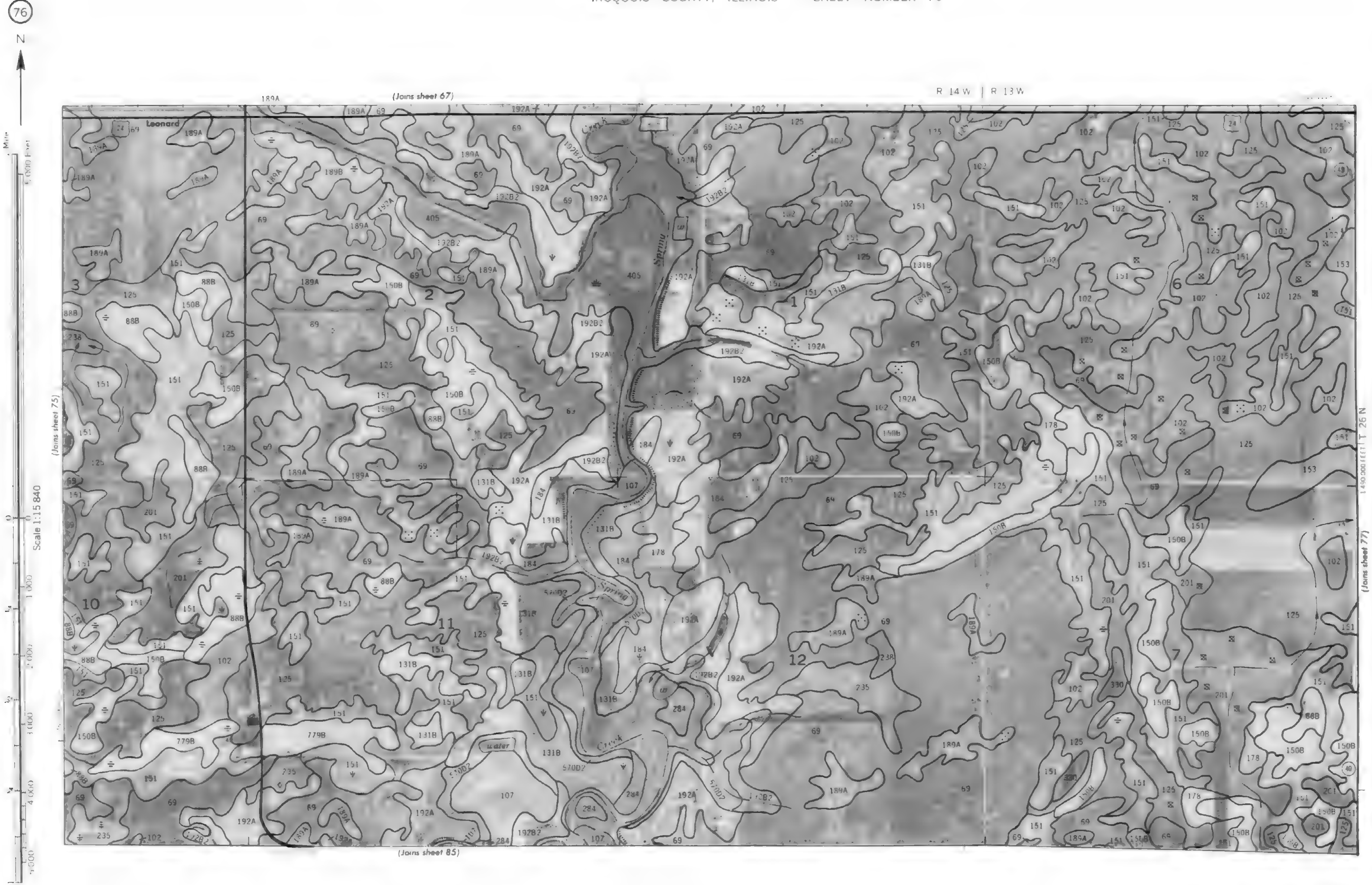

N
(Joins sheet 62)
(Joins sheet 72)
(Joins sheet 80)
(Joins sheet 70)
R 12 W
R 11 W
RIVER
IROQUOIS
Eastburn
Hollow
25
28
29
30
31
32
33
36
Scale 1:15 840

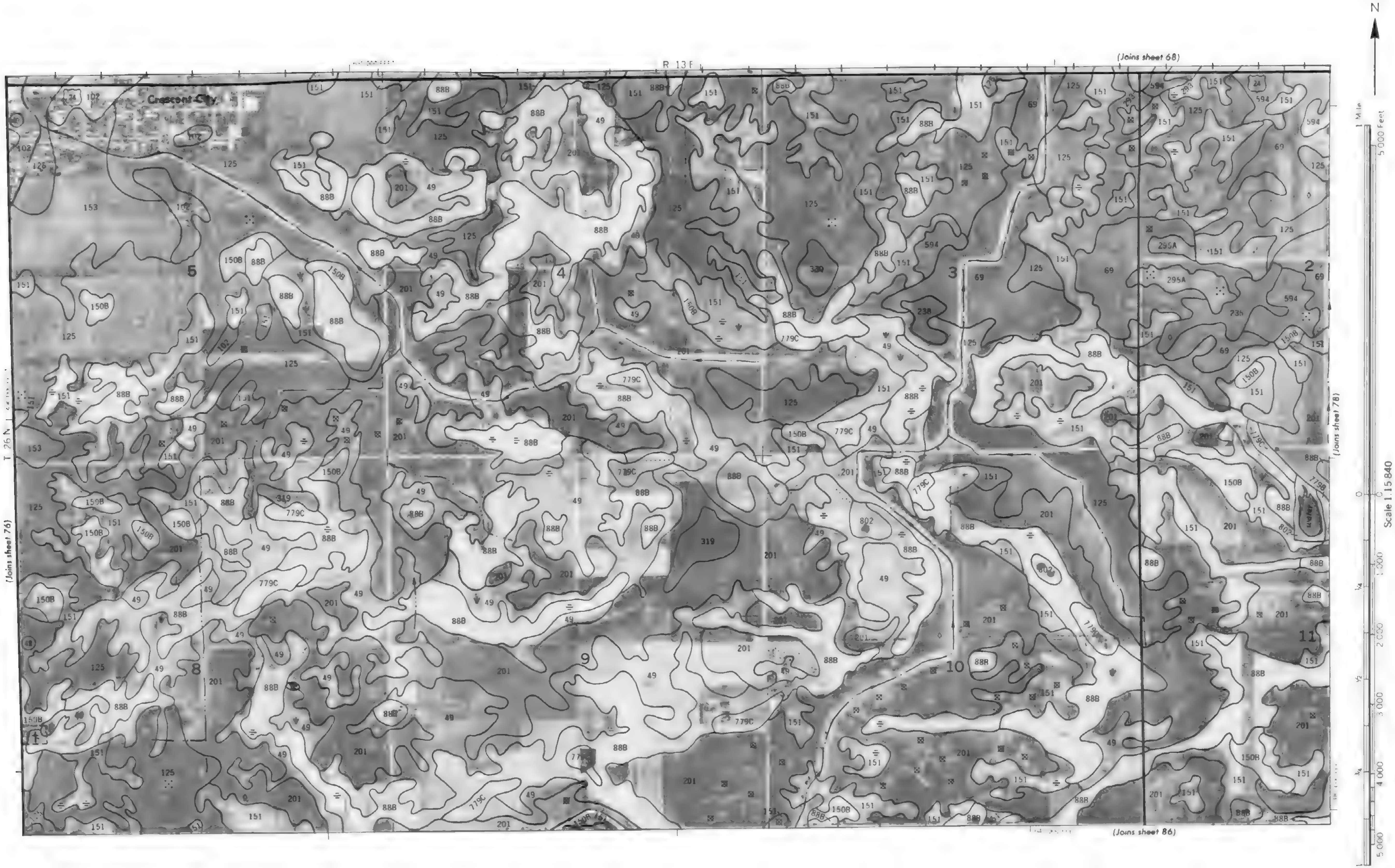

72
N
(Joins sheet 63)
R. 11 W. | R. 10 W.
(Joins sheet 71)
T. 27 N.
INDIANA
NEWTON COUNTY
(Joins sheet 81)
Scale 1:15 840
27
26
25
30
34
35
36
31


73
N
R 10 E
(Joins sheet 64)
(Joins sheet 74)
(Joins sheet 82)
FORD COUNTY T 26 N
La Hogue
Prairie Creek
Prairie Creek
1 Mile
5 000 Feet
Scale 1:15 840
6
5
4
3
7
8
9
10
153
102
69
330
125
151
150B
24

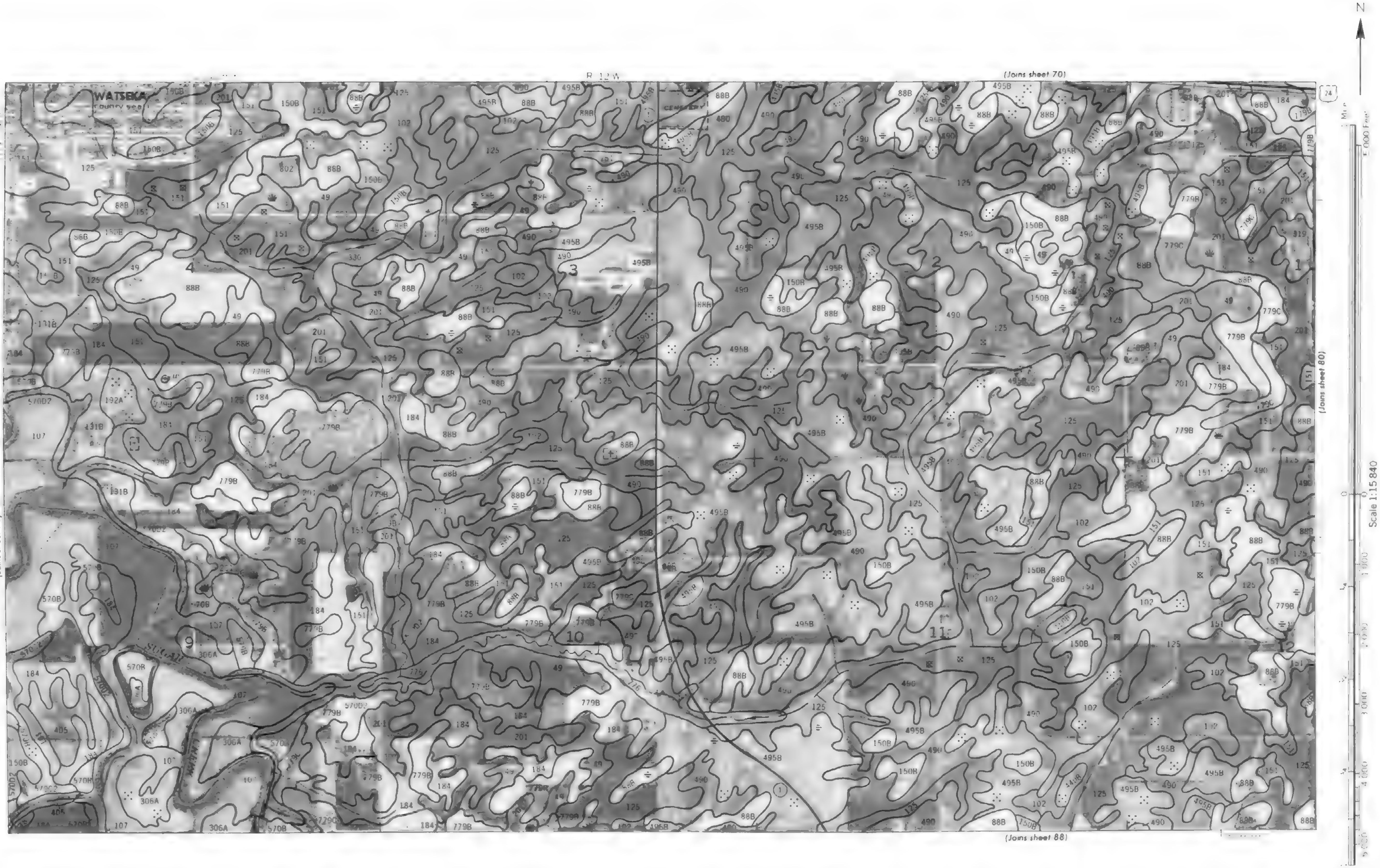

N
Scale 1:15 840
(Joins sheet 65)
(Joins sheet 73)
(Joins sheet 75)
(Joins sheet 83)
R 10 E
R 11 E
T 26 N
water


75
N
(Joins sheet 66)
(Joins sheet 84)
(Joins sheet 74)
(Joins sheet 76)
R. 14 W.
T. 26 N.
GILMAN
CEMETERY
Scale 1:15 840
1 Mile
5 000 Feet
1 000
2 000
3 000
4 000
5 000


76
N
(Joins sheet 67)
R 14 W
R 13 W
Leonard
(Joins sheet 75)
(Joins sheet 77)
T 26 N
(Joins sheet 85)
Spring
Creek
water
Scale 1:15 840


N
R 13 E
(Joins sheet 68)
Crescent City
T 26 N
(Joins sheet 76)
(Joins sheet 78)
(Joins sheet 86)
5
4
3
2
8
9
10
11
water
1 Mile
5 000 Feet
Scale 1:15 840

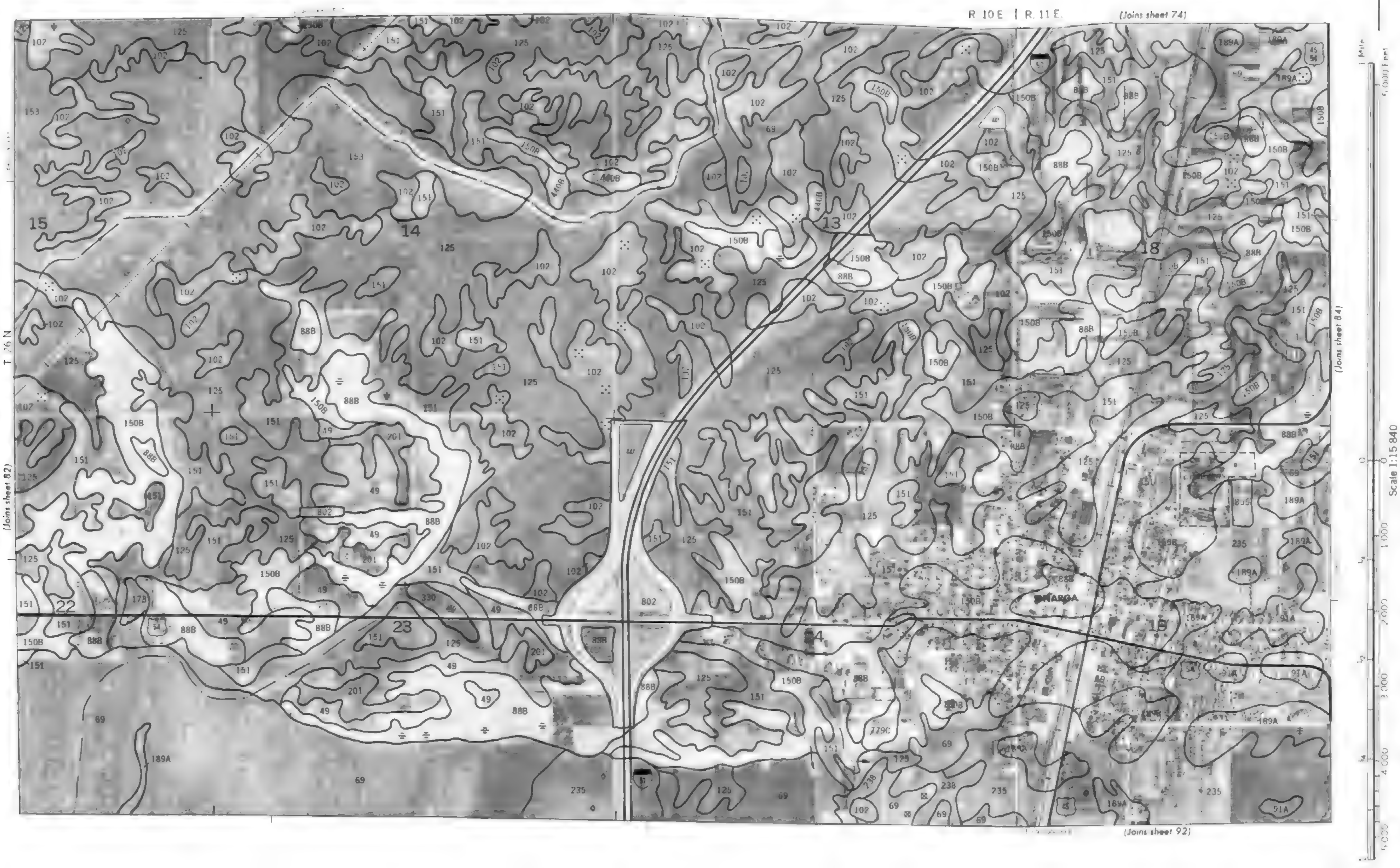

N
(Joins sheet 69)
R. 13 W.
(Joins sheet 77)
(Joins sheet 79)
(Joins sheet 87)
WATSEKA
(county seat)
Coaler
Scale 1:15 840


N
R. 12 W.
(Joins sheet 70)
(Joins sheet 80)
(Joins sheet 88)
(Joins sheet 78)
T. 26 N.
WATSEKA
(county seat)
CEMETERY
SUGAR
Scale 1:15 840


N
R. 12 W.
R. 11 W.
(Joins sheet 71)
(Joins sheet 79)
(Joins sheet 81)
(Joins sheet 89)
T. 26 N.
Scale 1:15 840
Eastburn
Eastburn Hollow
Webster
Ditch No. 2
Ditch No. 1
1
4
5
6
7
8
9
12

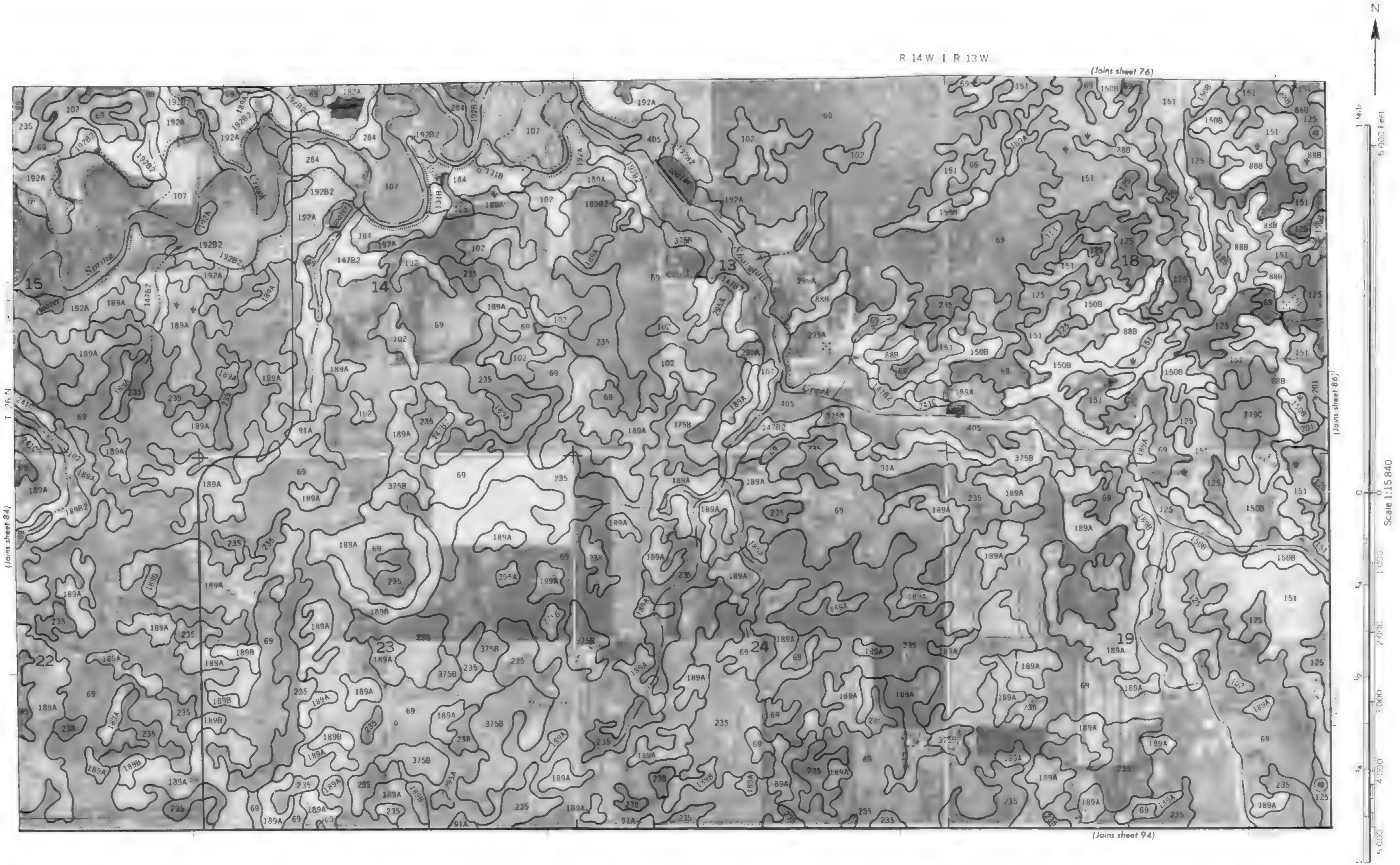

N
R. 11 W. | R. 10 W.
(Joins sheet 72)
SHELDON
Webster
Sheldon Municipal Landing Strip
CEMETERY
Elmer
T. 26 N.
(Joins sheet 80)
(Joins sheet 90)
INDIANA
NEWTON COUNTY
Scale 1:15 840
Mile
5 000 Feet


N
Scale 1:15 840
(Joins sheet 73)
R. 10 E.
(Joins sheet 83)
(Joins sheet 91)
T. 26 N.
FORD COUNTY
Prairie
Creek
Ridgeville
18
17
16
15
19
20
21
22


N
R 10 E | R. 11 E.
(Joins sheet 74)
(Joins sheet 84)
(Joins sheet 92)
(Joins sheet 82)
T 26 N
ONARGA
Scale 1:15 840
1 Mile

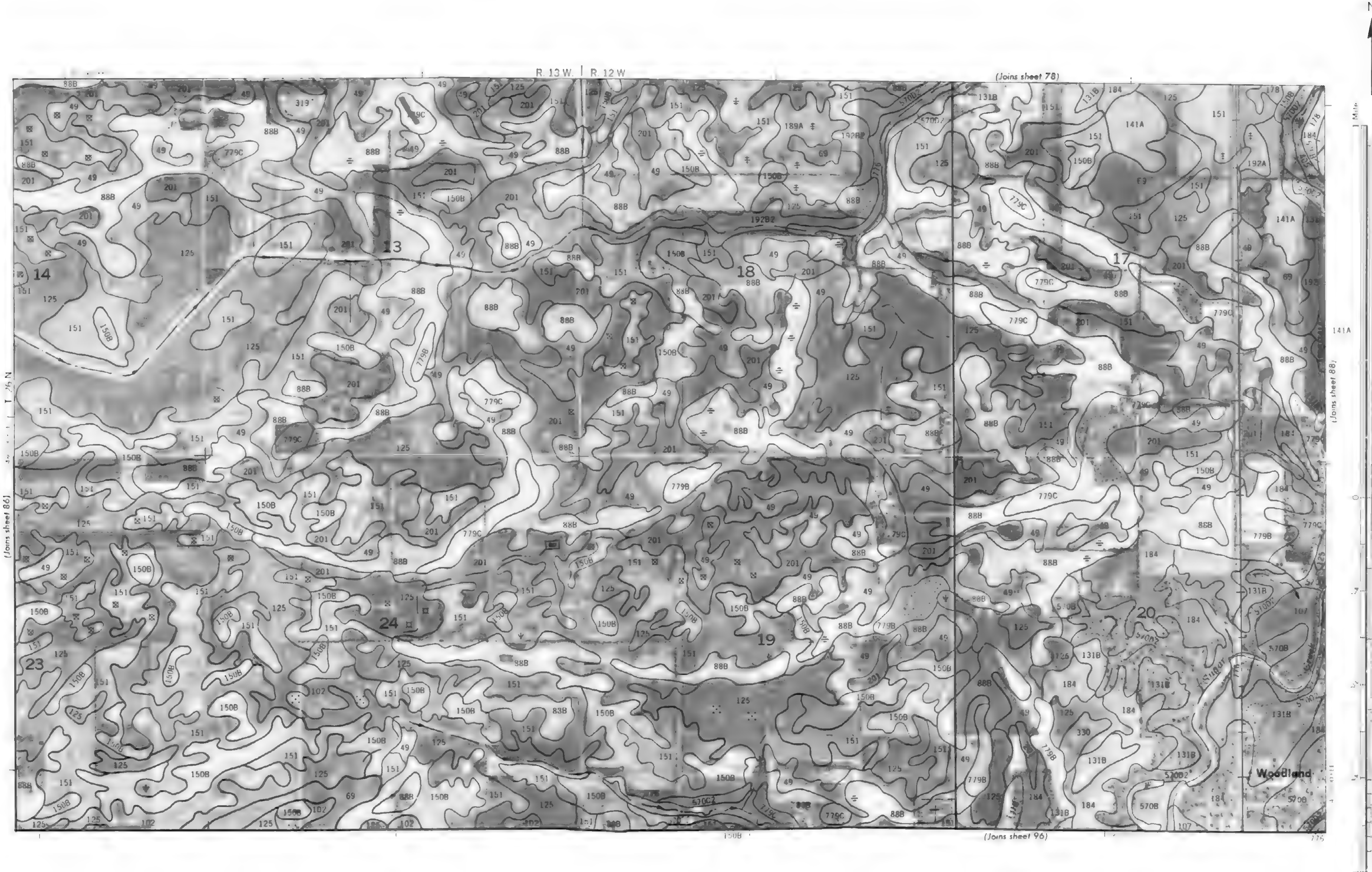
84

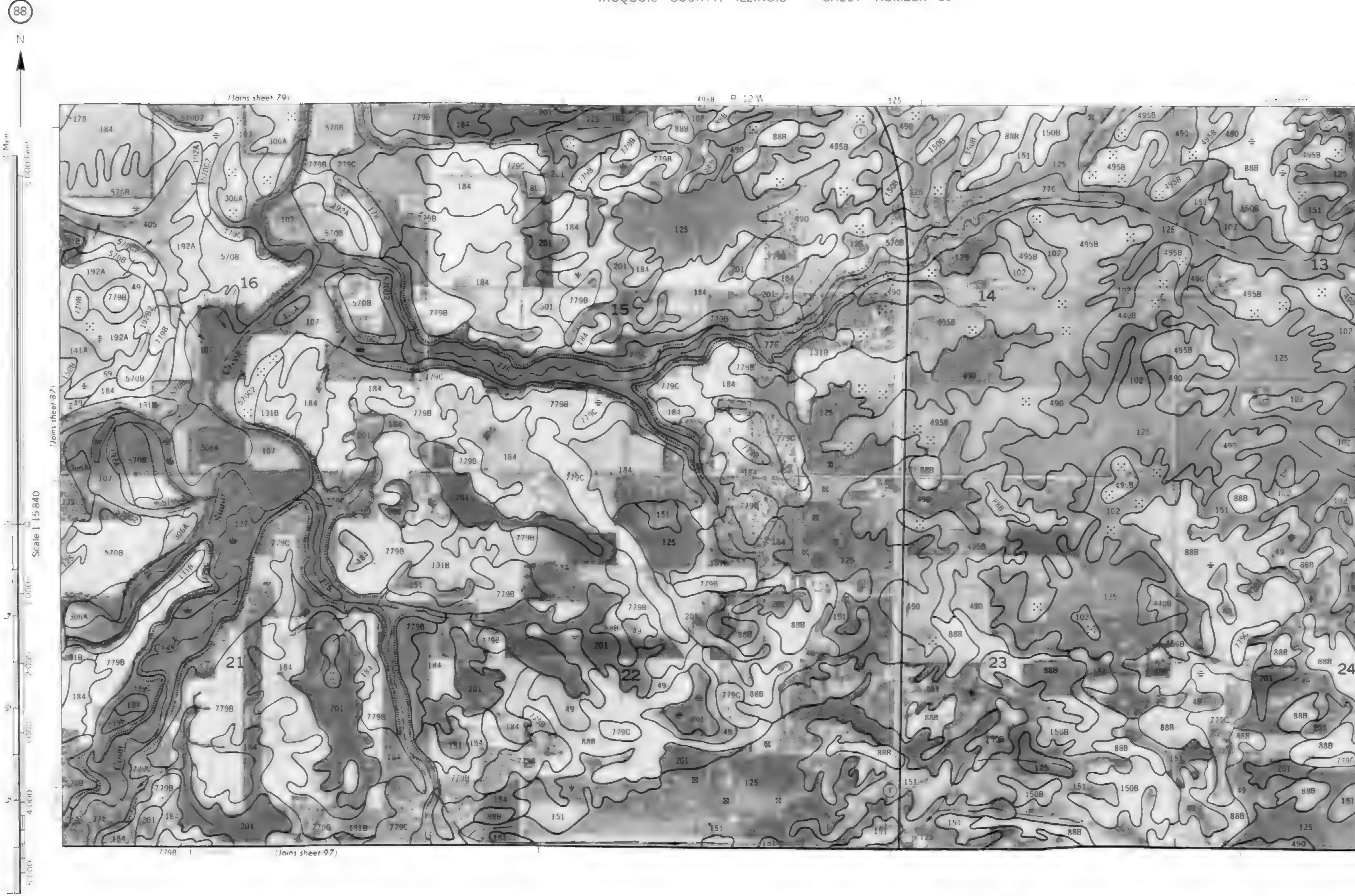

N
1 Mile
Scale 1:15 840
(Joins sheet 75)
R. 14 W.
(Joins sheet 83)
(Joins sheet 85)
(Joins sheet 93)
18
17
16
15
19
20
21
22
Spring
Creek
Spring
Creek

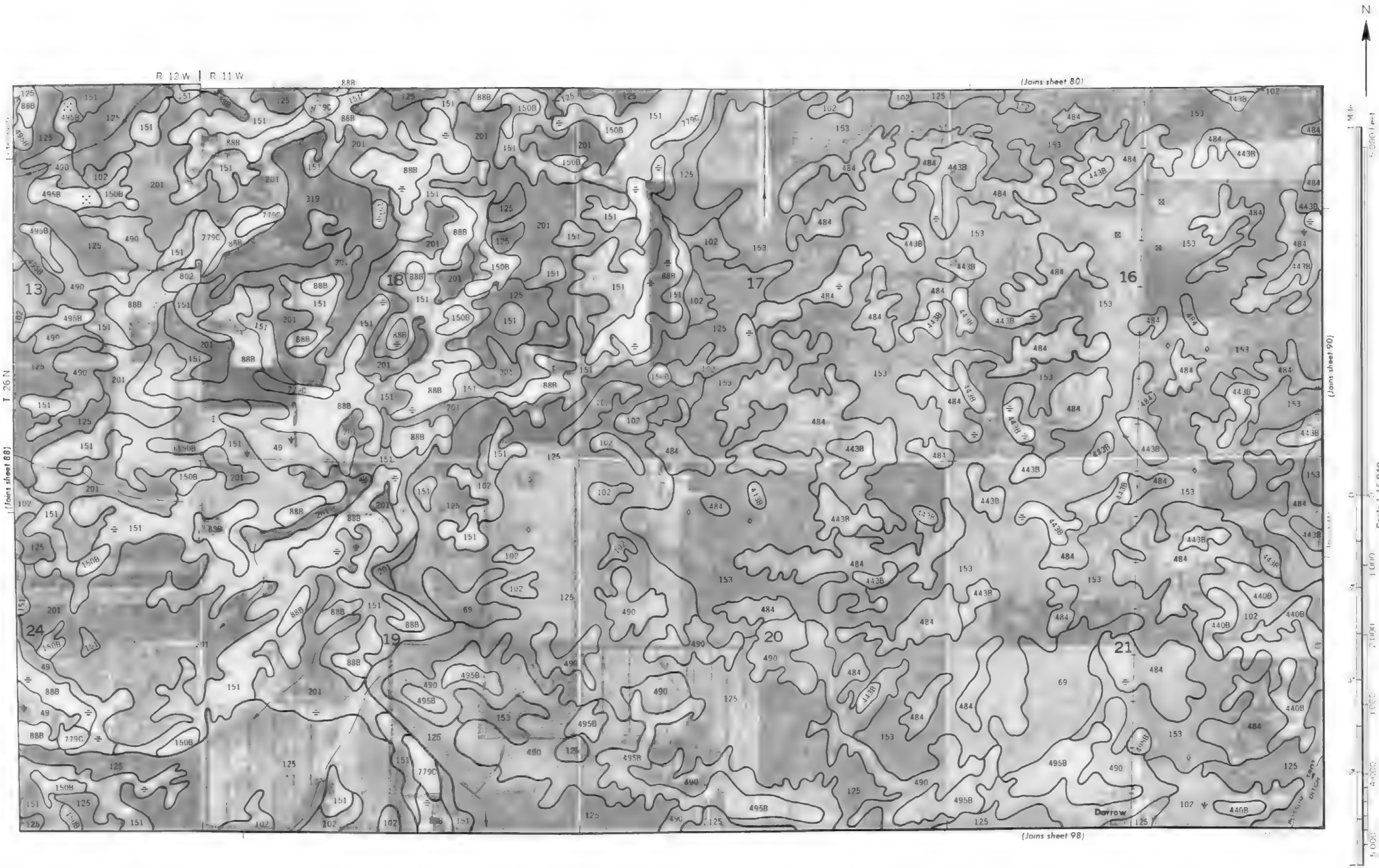

N
R 14 W. | R 13 W.
(Joins sheet 76)
(Joins sheet 84)
(Joins sheet 86)
(Joins sheet 94)
T 26 N
Spring Creek
Shaw Creek
13
14
15
18
19
22
23
24
Scale 1:15 840
1 Mile
5 000 Feet
0
1000
2000
3000
4000
5000


N
(Joins sheet 77)
(Joins sheet 85)
(Joins sheet 87)
(Joins sheet 95)
Scale 1:15 840
1 Mile
17
16
15
14
20
21
22
23

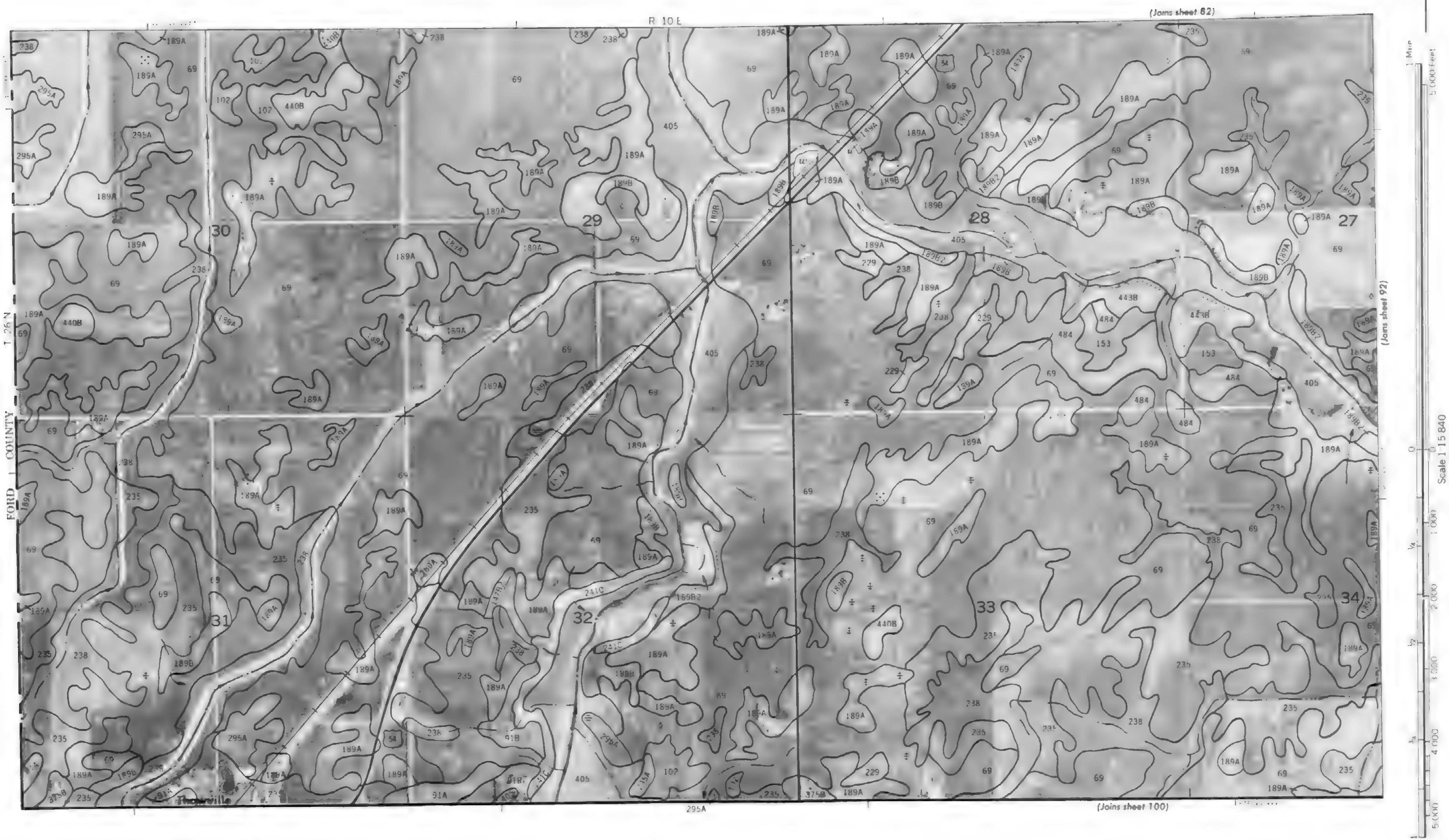
87


N
R. 13 W.
R. 12 W.
(Joins sheet 78)
(Joins sheet 86)
(Joins sheet 88)
(Joins sheet 96)
T. 26 N.
13
14
17
18
19
20
23
24
Woodland
Scale 1:15 840
1 Mile
5 000 Feet

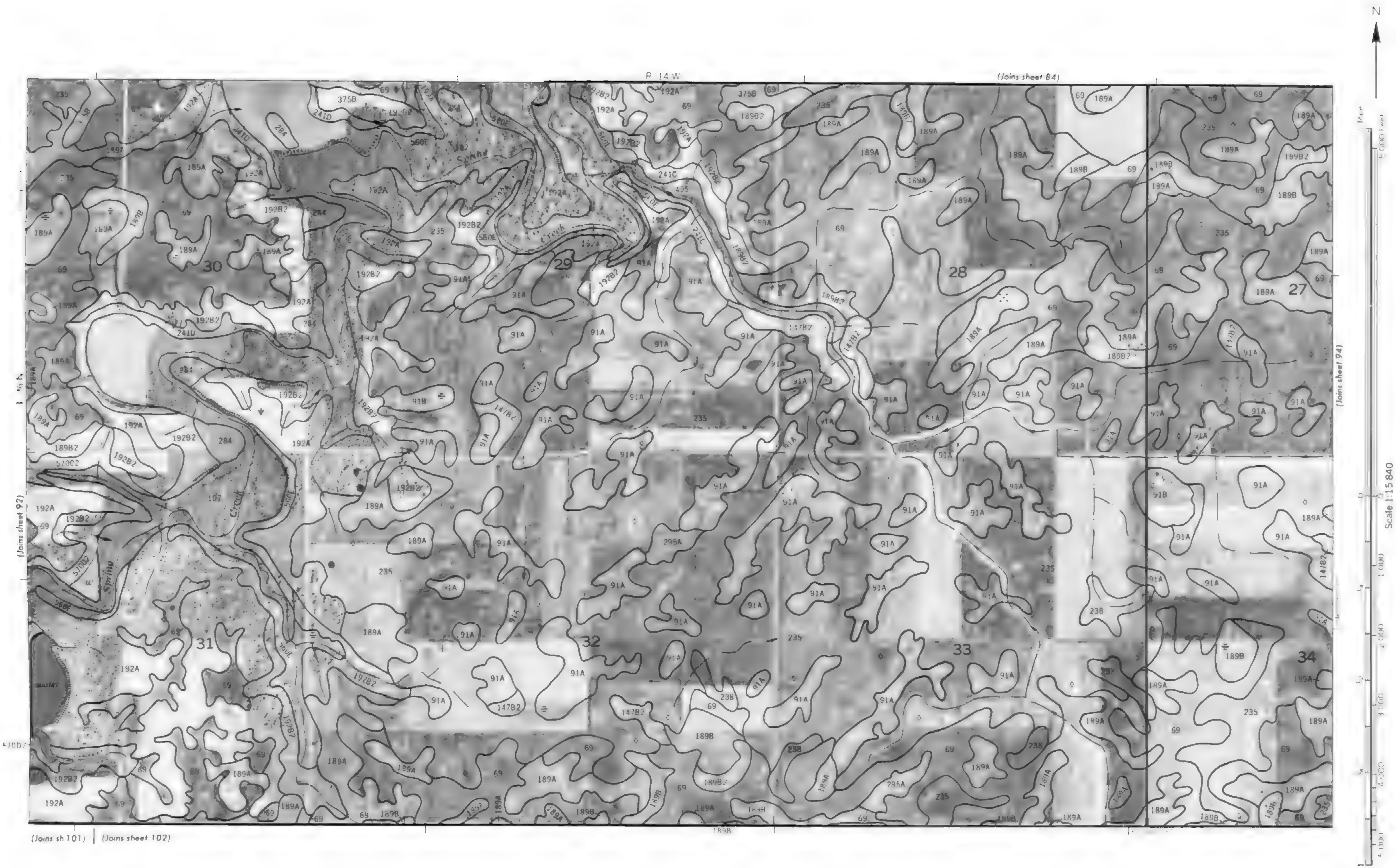

88
N
(Joins sheet 79)
R. 12 W.
(Joins sheet 87)
(Joins sheet 89)
(Joins sheet 97)
T. 26 N.
Scale 1:15 840
16
15
14
13
21
22
23
24
Sugar Creek

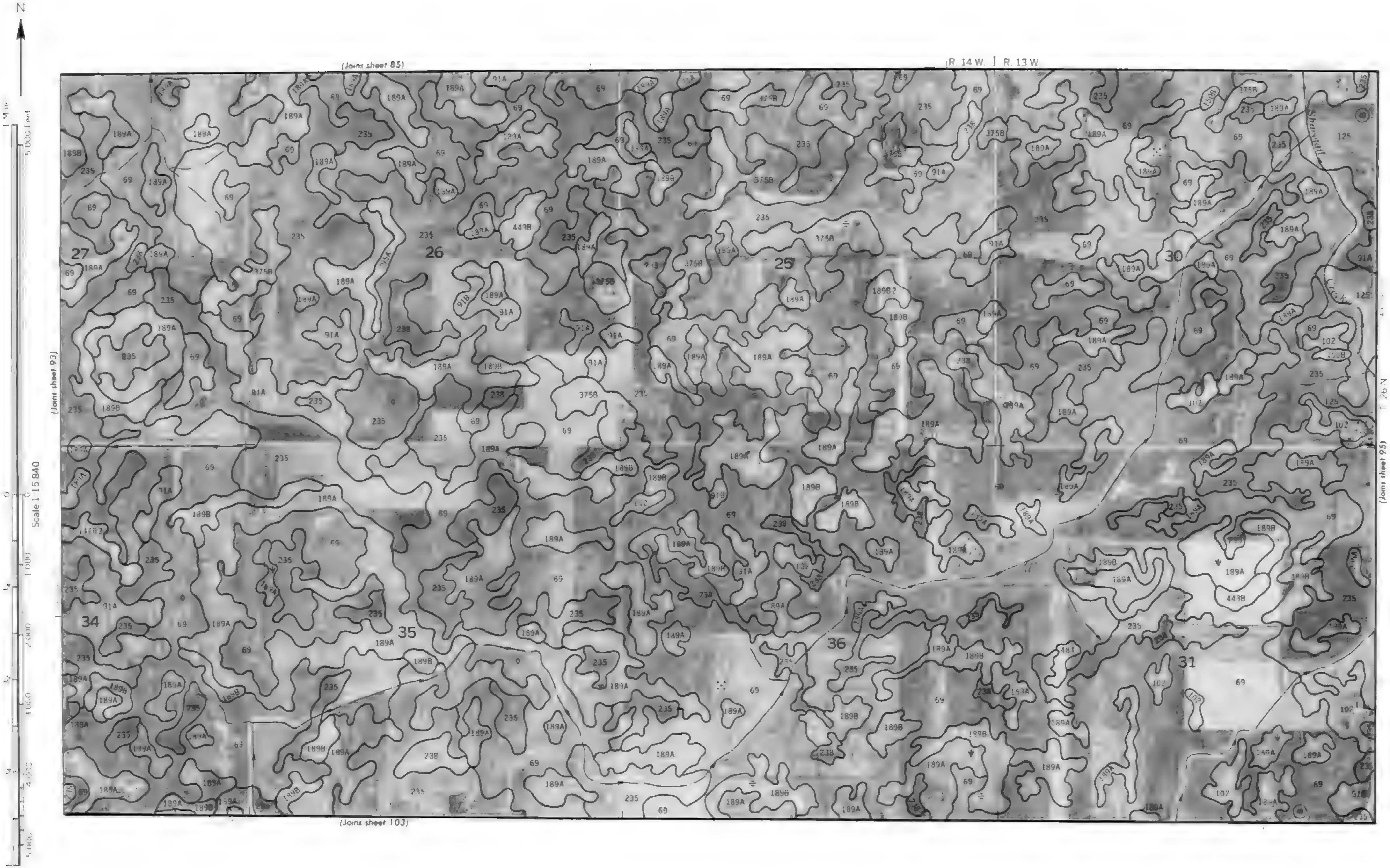

N
R 12 W
R 11 W
(Joins sheet 80)
(Joins sheet 88)
(Joins sheet 90)
(Joins sheet 98)
T 26 N
13
18
17
16
24
19
20
21
Darrow
Scale 1:15 840


N
(Joins sheet 81)
R. 11 W
R. 10 W
(Joins sheet 89)
T. 26 N
Scale 1:15 840
1 Mile
5,000 Feet
(Joins sheet 99)
INDIANA
NEWTON COUNTY
BENTON COUNTY
15
14
13
18
22
23
24
19
POSSUM
TROUT

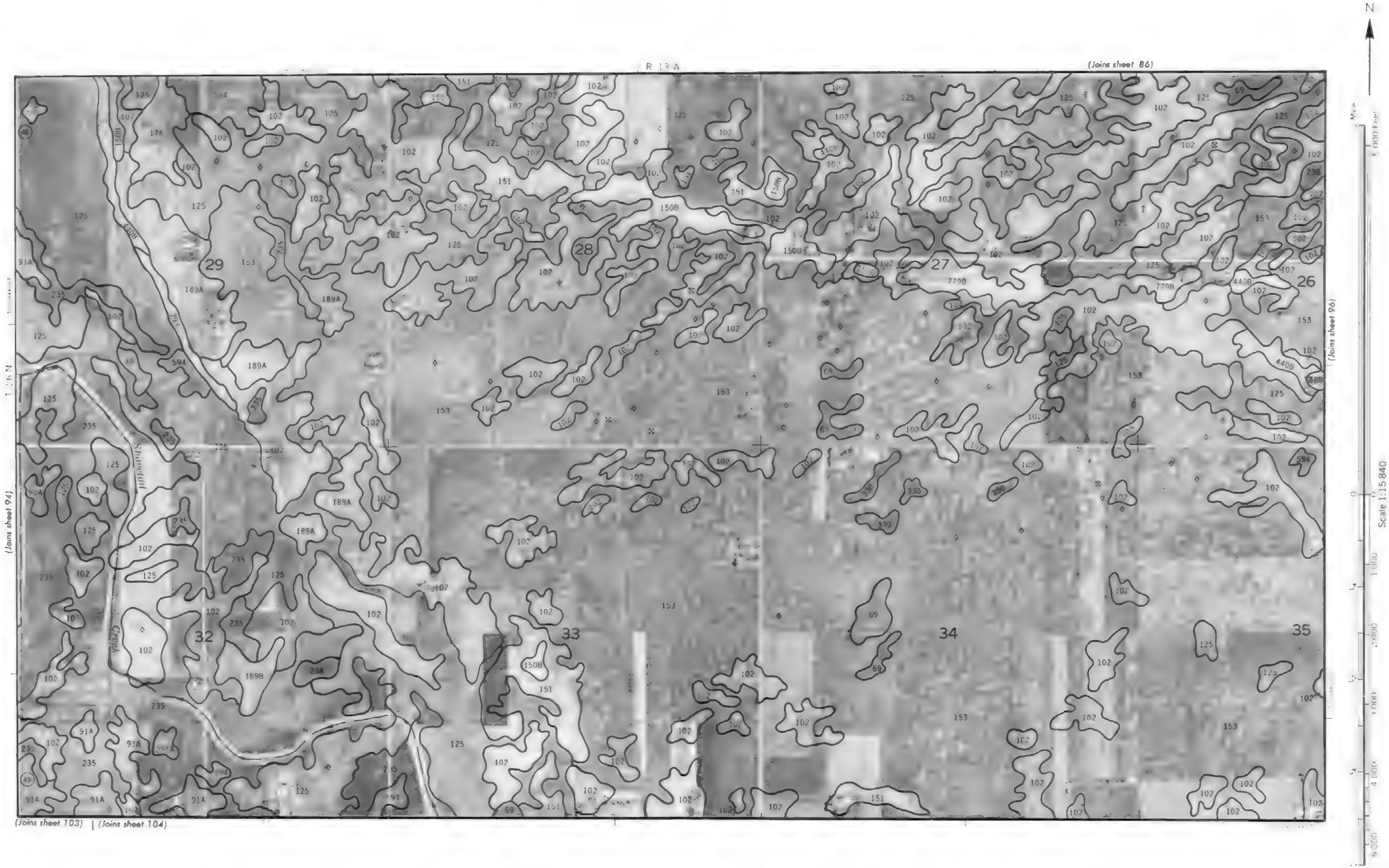

91
N
(Joins sheet 82)
R 10 E
T 26 N
FORD COUNTY
(Joins sheet 92)
(Joins sheet 100)
Scale 1:15 840
1 Mile
5 000 Feet
Thawville
27
28
29
30
31
32
33
34

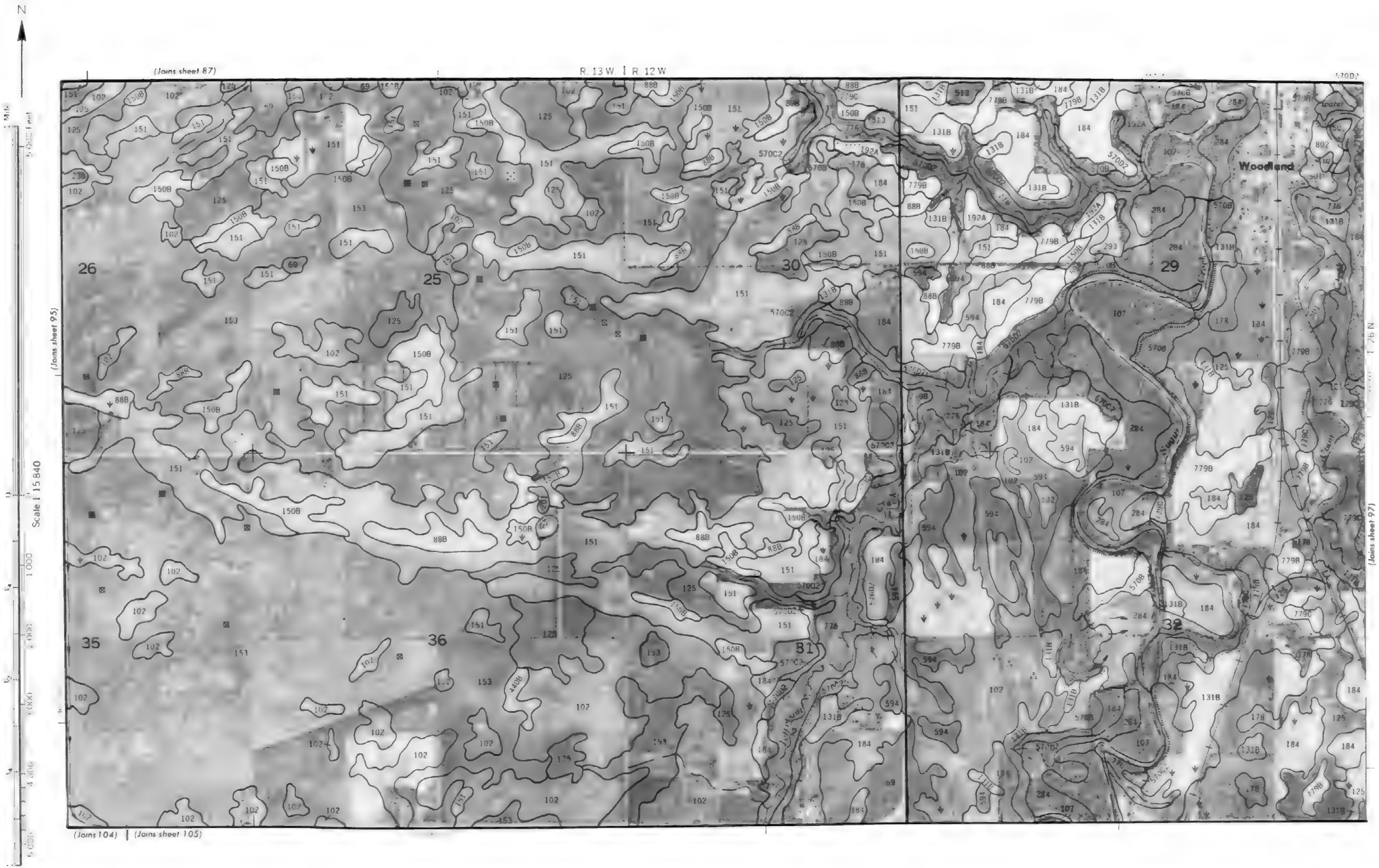

N
Scale 1:15 840
5 000 Feet
(Joins sheet 83)
(Joins sheet 101)
(Joins sheet 91)
(Joins sheet 93)
R. 10 E.
R. 11 E.
27
26
25
30
34
35
36
31

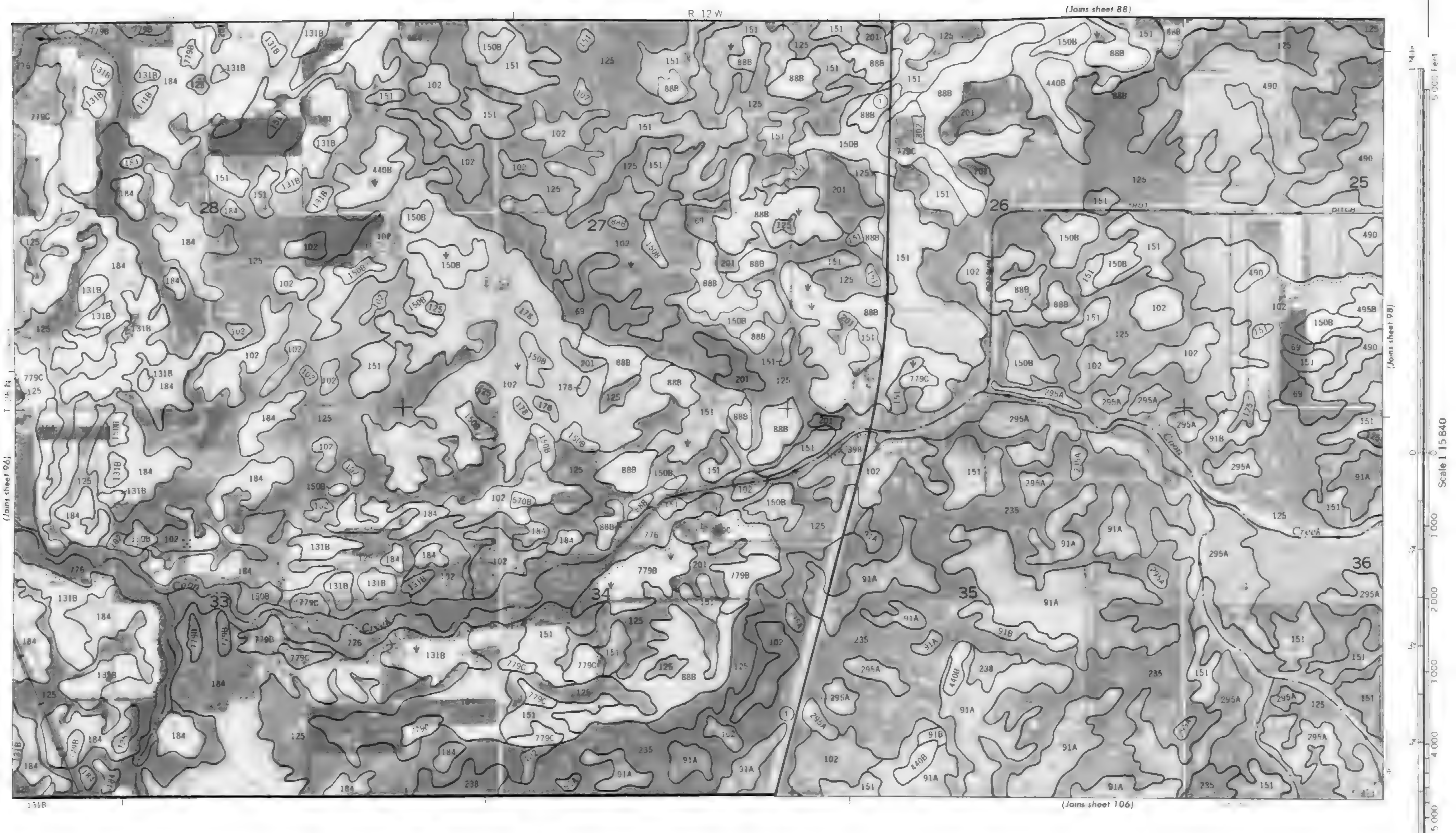

N
R. 14 W.
(Joins sheet 84)
(Joins sheet 94)
(Joins sheet 92)
(Joins sh 101)
(Joins sheet 102)
30
29
28
27
31
32
33
34
Spring Creek
Sugar Creek
Scale 1:15 840


N
(Joins sheet 85)
R. 14 W. | R. 13 W.
(Joins sheet 93)
(Joins sheet 95)
(Joins sheet 103)
T. 26 N.
Scale 1:15 840
5 000 Feet
27
26
25
30
34
35
36
31
Shantytail
Creek

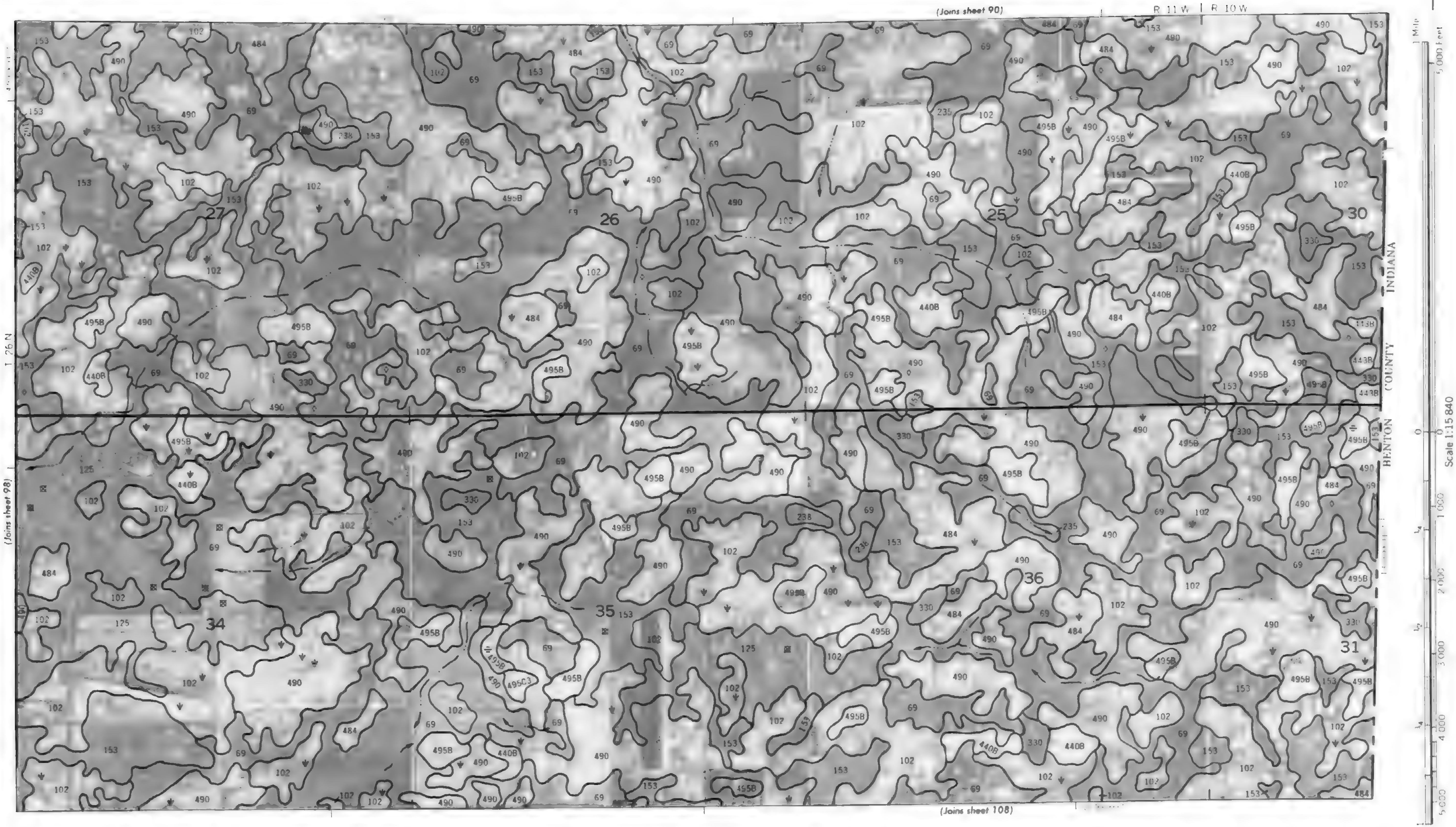
95


N
R. 13 W.
(Joins sheet 86)
(Joins sheet 94)
(Joins sheet 96)
(Joins sheet 103)
(Joins sheet 104)
T. 26 N.
29
28
27
26
32
33
34
35
Shapland Creek
Scale 1:15 840


N
(Joins sheet 87)
R. 13 W. | R. 12 W.
(Joins sheet 95)
(Joins sheet 97)
(Joins 104) | (Joins sheet 105)
T. 26 N.
Scale 1:15 840
Woodland
26
25
30
29
35
36
31
32

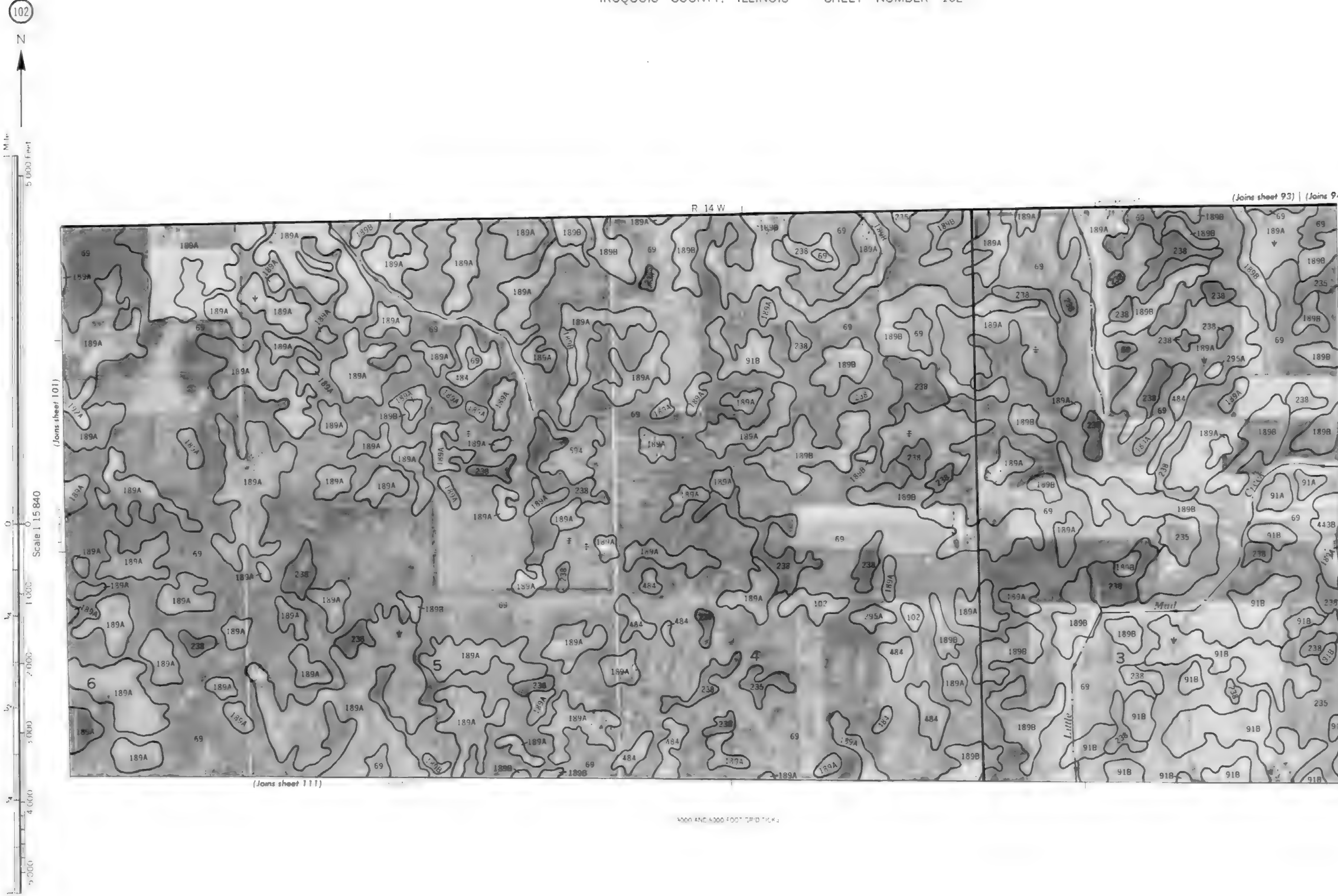

97
N
R 12 W
(Joins sheet 88)
(Joins sheet 96)
(Joins sheet 98)
(Joins sheet 106)
28
27
26
25
33
34
35
36
Coon Creek
Scale 1:15 840
1 Mile
5 000 Feet

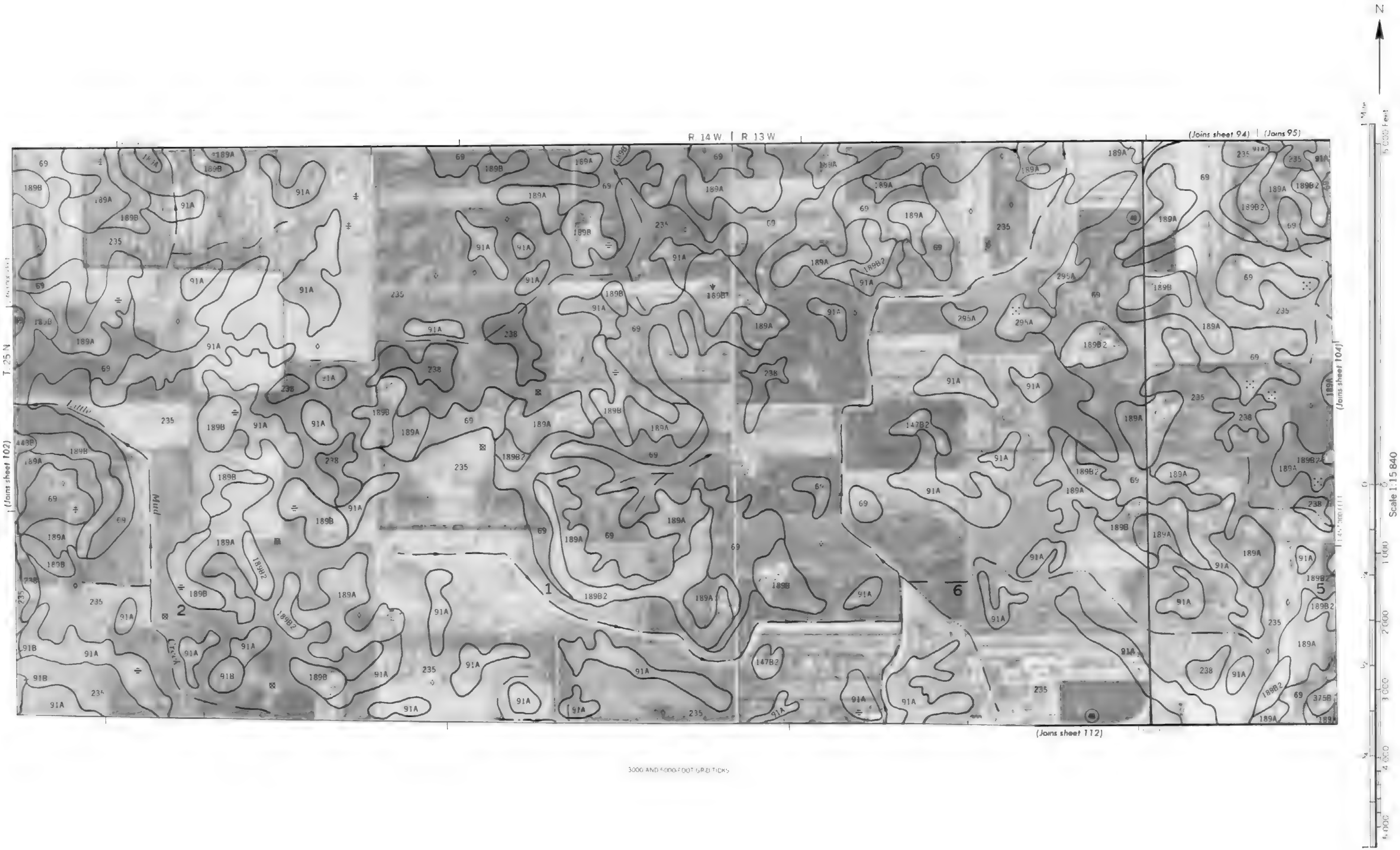

N
R. 12 W. | R. 11 W.
(Joins sheet 89)
(Joins sheet 97)
(Joins sheet 99)
(Joins sheet 107)
T. 26 N.
Scale 1:15 840
1 Mile
5 000 Feet
TROT DITCH
Coon Creek
25
30
29
28
36
31
32
33

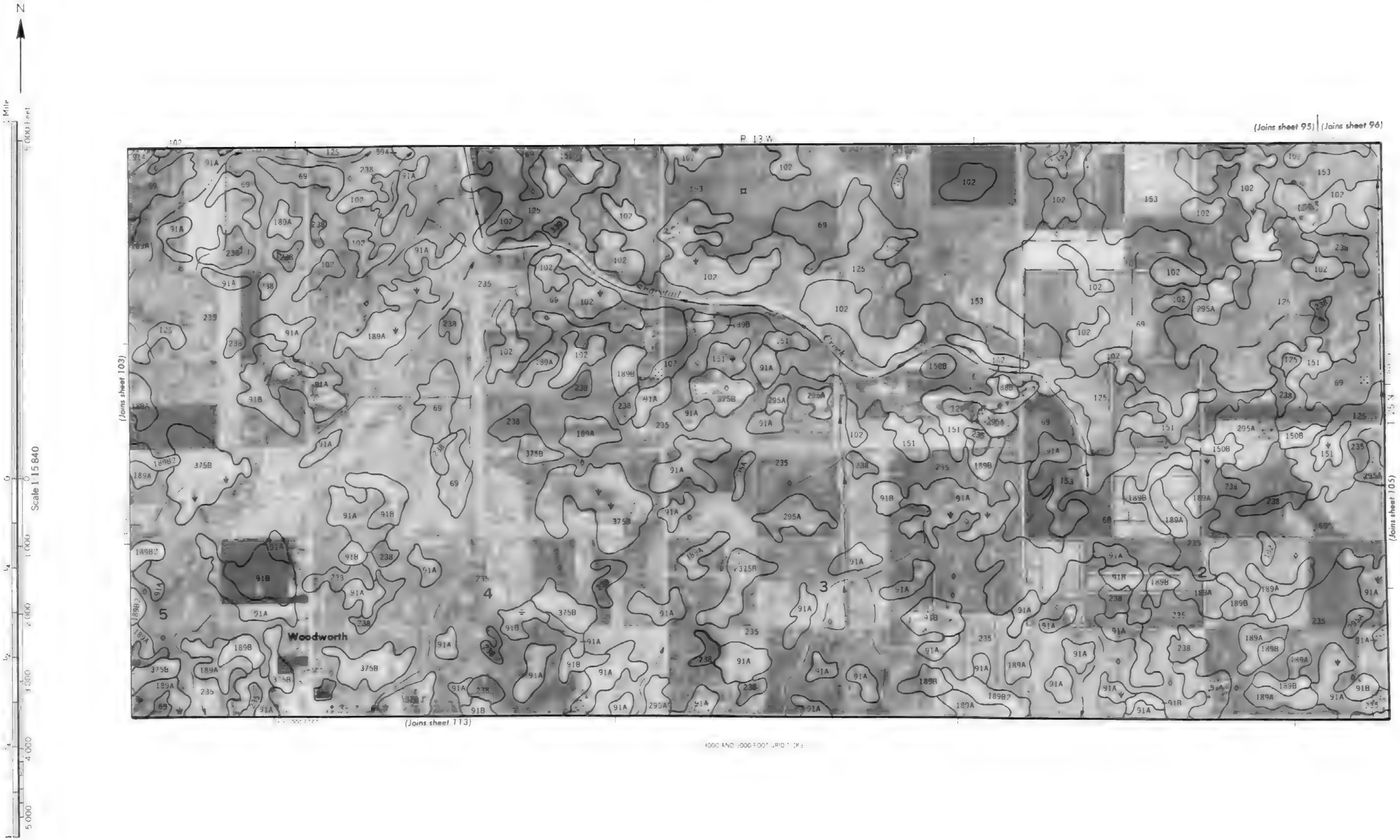

N
(Joins sheet 90)
R 11 W | R 10 W
(Joins sheet 98)
(Joins sheet 108)
T 26 N
INDIANA
BENTON COUNTY
27
26
25
30
34
35
36
31
1 Mile
5,000 Feet
Scale 1:15 840

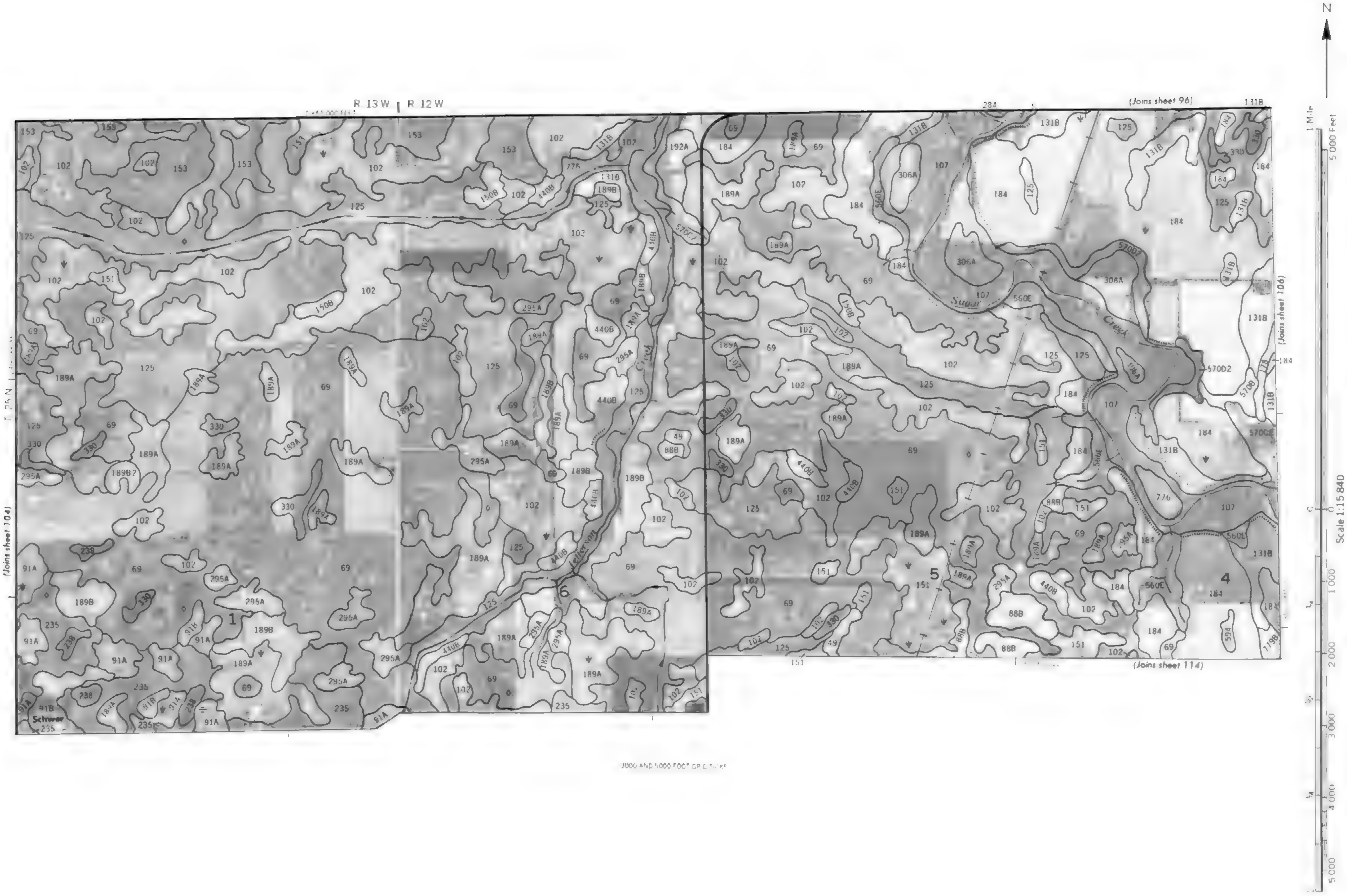

N
Scale 1:15 840
1 Mile
5 000 Feet
(Joins sheet 91)
R 10 E
T 25 N
(Joins sheet 101)
(Joins sheet 109)
FORD COUNTY
Thawville
3000 AND 5000 FOOT GRID TICKS


N
R. 10 E.
R. 11 E.
R. 11 E.
R. 14 W.
(Joins sheet 92)
(Joins sheet 93)
(Joins sheet 100)
(Joins sheet 102)
(Joins sheet 110)
T. 25 N.
Dewey
water
water
Spring
Creek
45
57
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000
3000 AND 5000 FOOT GRID TICKS

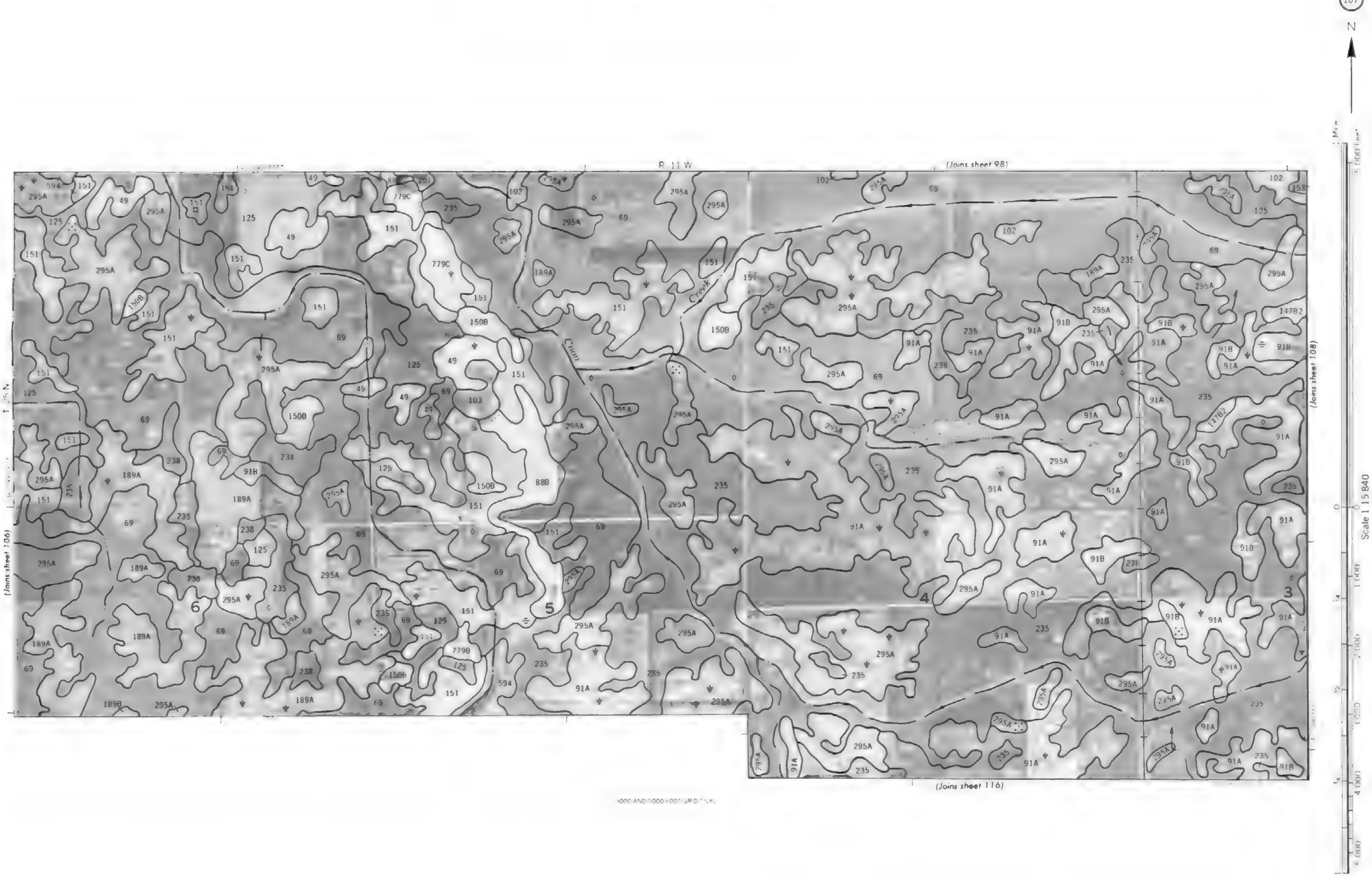

102
N
1 Mile
5 000 Feet
Scale 1:15 840
R. 14 W.
(Joins sheet 93) | (Joins 94)
(Joins sheet 101)
(Joins sheet 103)
(Joins sheet 111)
T. 25 N.
Mud
Creek
Little
6
5
4
3
3000 AND 5000 FOOT GRID TICKS

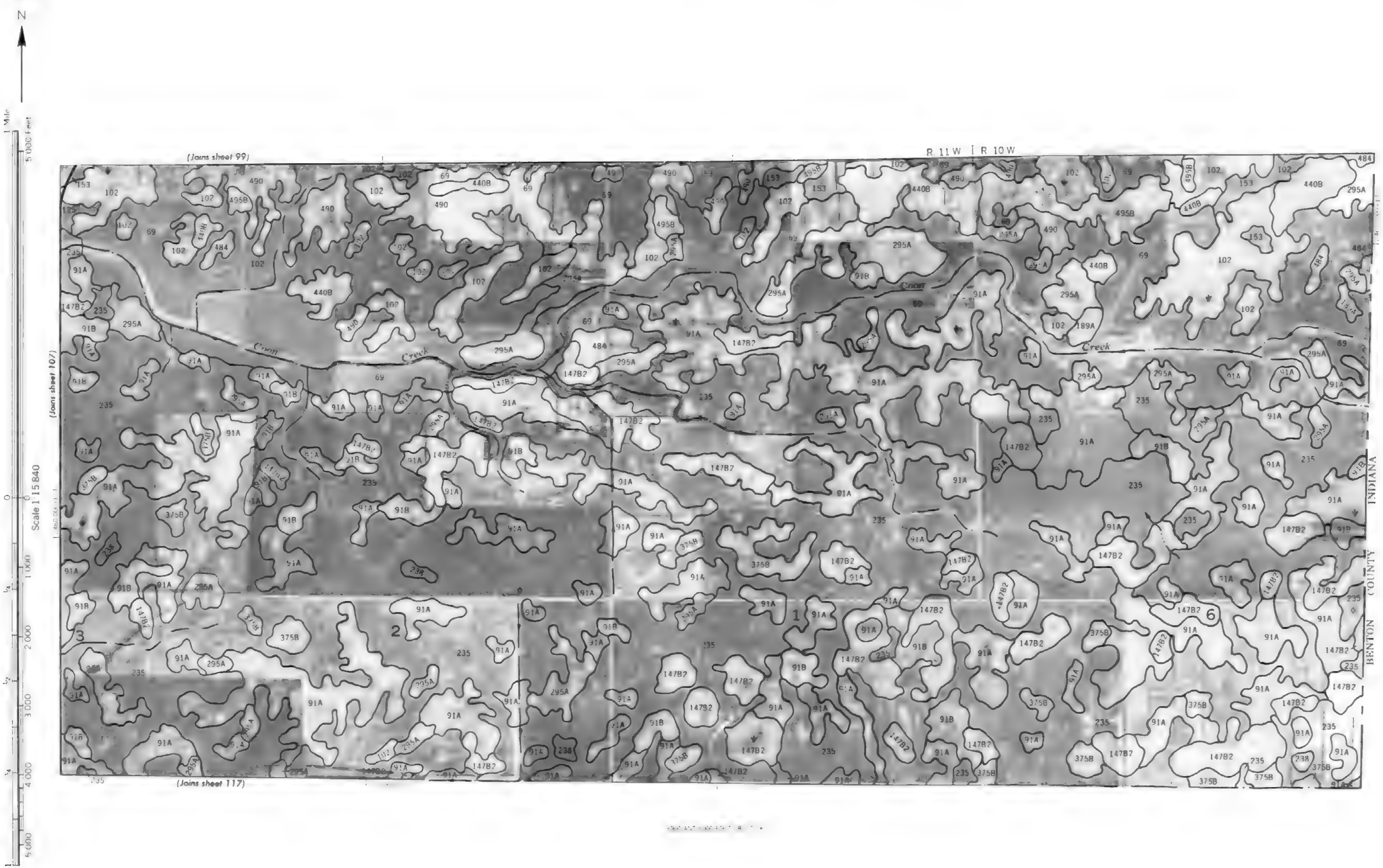

N
R. 14 W. | R. 13 W.
(Joins sheet 94) | (Joins 95)
T. 25 N
(Joins sheet 102)
(Joins sheet 104)
(Joins sheet 112)
Little
Mud
Creek
Scale 1:15 840
5 000 Feet
1 Mile
3000 AND 5000-FOOT GRID TICKS

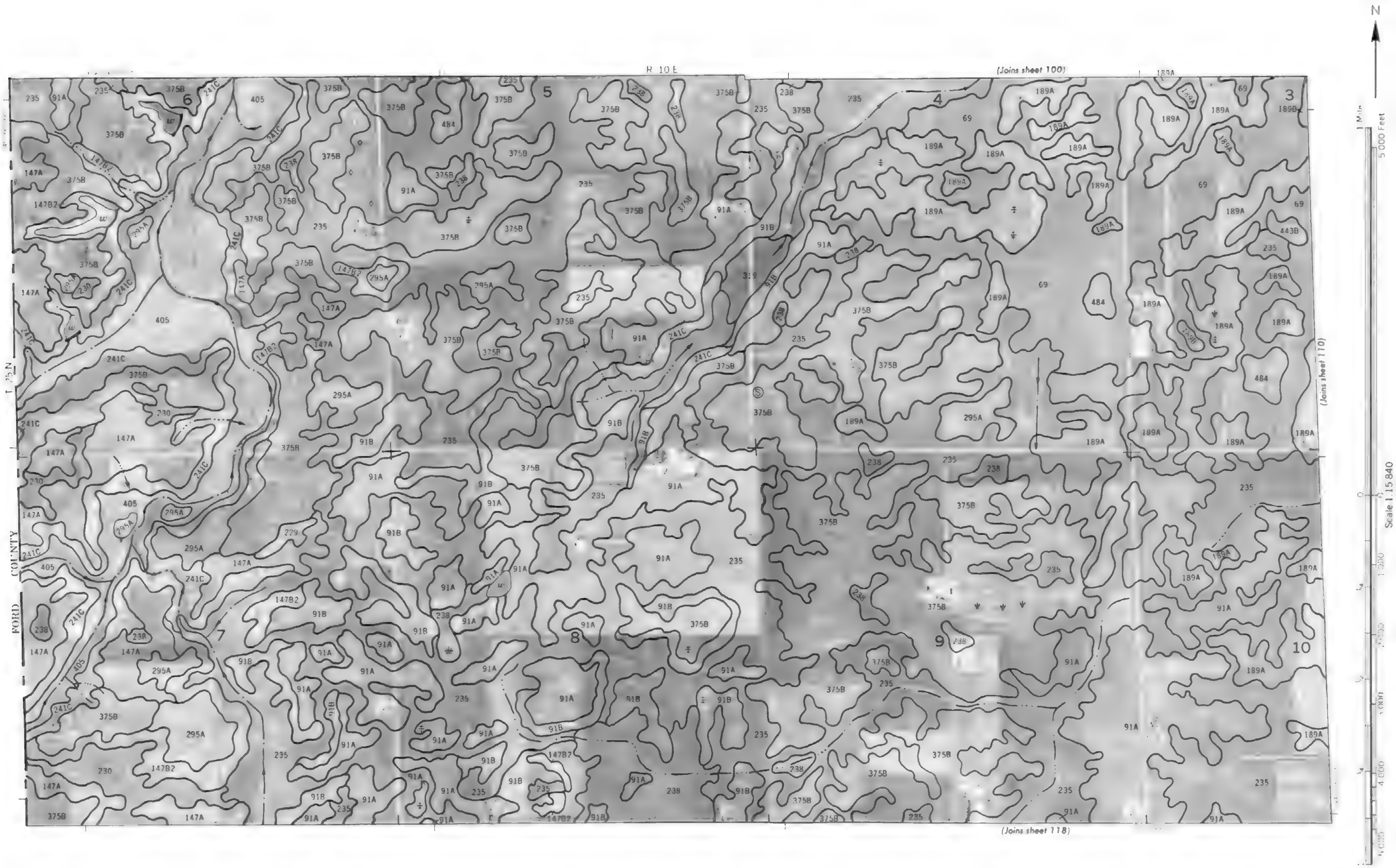

104
N
Scale 1:15 840
(Joins sheet 95)
(Joins sheet 96)
R. 13 W.
(Joins sheet 103)
(Joins sheet 105)
(Joins sheet 113)
Woodworth
Creek
2
3
4
5


N
R. 13 W
R. 12 W
(Joins sheet 96)
(Joins sheet 106)
(Joins sheet 114)
(Joins sheet 104)
T. 25 N.
Sugar Creek
Jefferson Creek
Schwer
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000
3000 AND 5000 FOOT GRID TICKS

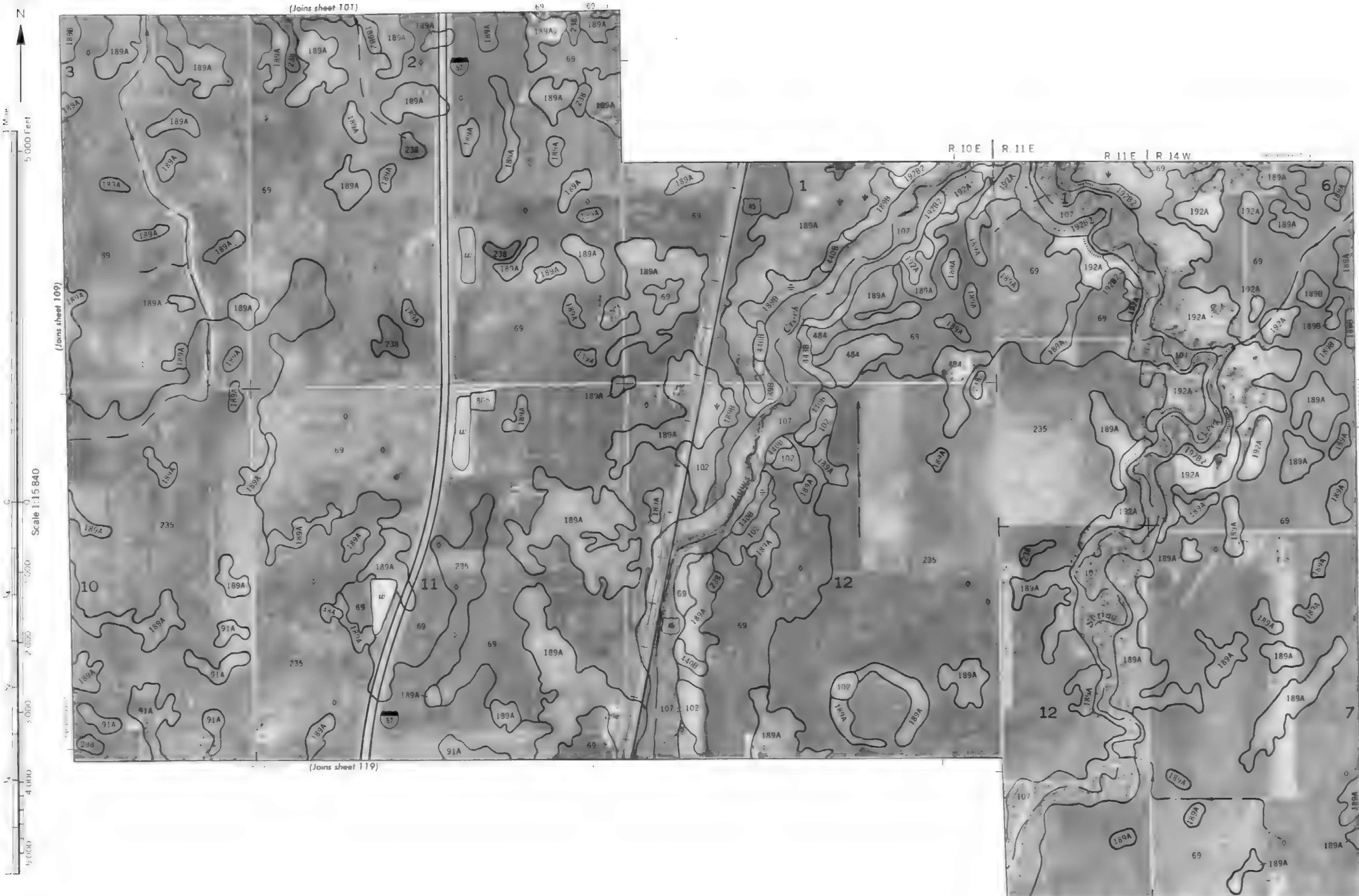

N
1 Mile
5 000 Feet
Scale 1:15 840
(Joins sheet 97)
R. 12 W.
(Joins sheet 105)
(Joins sheet 107)
(Joins sheet 115)
T. 25 N.
Sugar
Creek
3000 AND 5000-FOOT GRID TICKS


107
N
R. 11 W.
(Joins sheet 98)
(Joins sheet 108)
(Joins sheet 116)
(Joins sheet 106)
Scale 1:15 840
Creek
6
5
4
3


N
1 Mile
5 000 Feet
Scale 1:15 840
(Joins sheet 99)
(Joins sheet 107)
(Joins sheet 117)
R 11 W
R 10 W
Coon Creek
Coon Creek
Coon
Creek
INDIANA
BENTON COUNTY

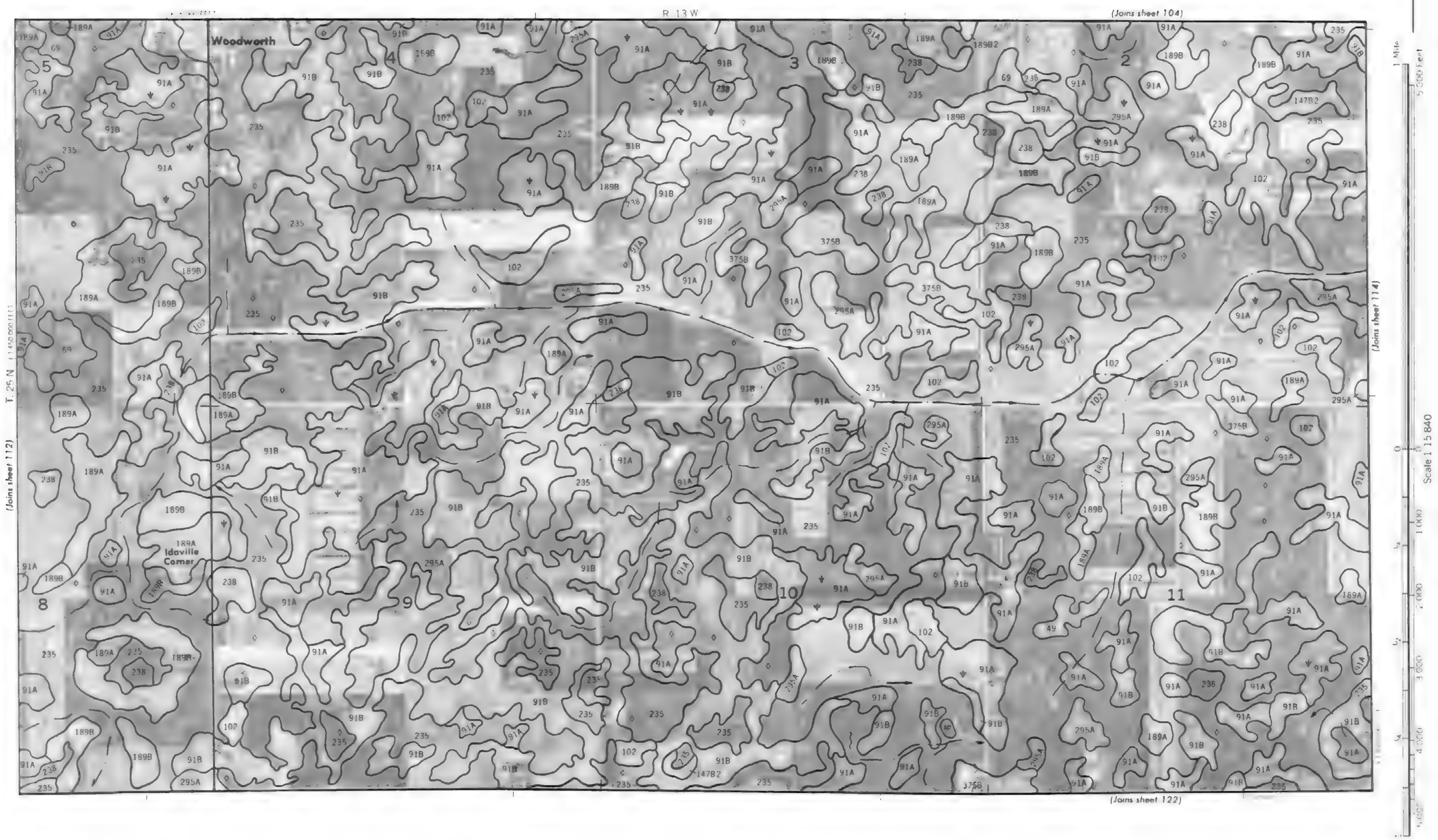

N
R. 10 E.
(Joins sheet 100)
(Joins sheet 110)
(Joins sheet 118)
T. 25 N.
FORD COUNTY
6
5
4
3
7
8
9
10
1 Mile
5 000 Feet
Scale 1:15 840

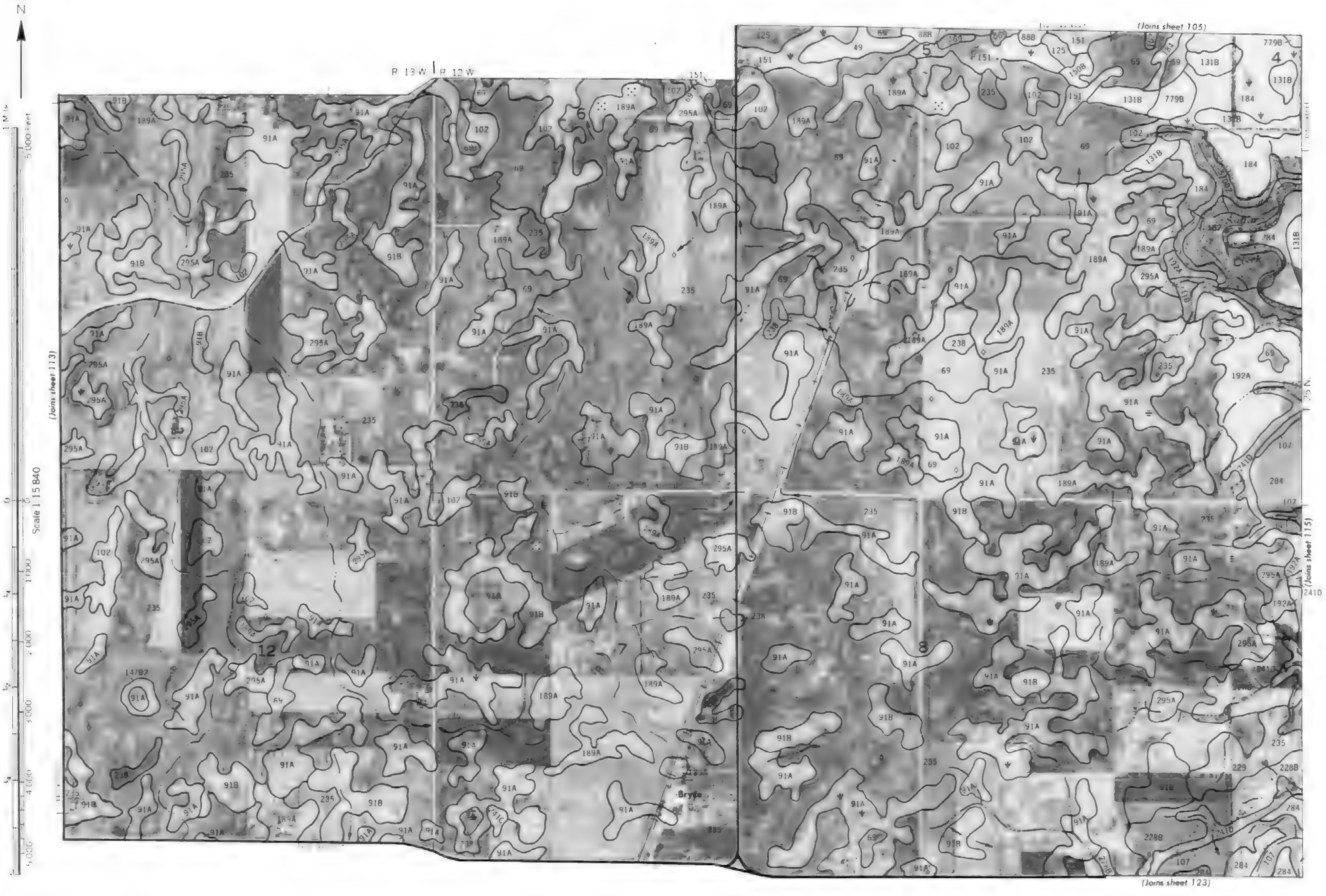
IROQUOIS COUNTY, ILLINOIS — SHEET NUMBER 110




111
N
R 14 W
(Joins sheet 102)
(Joins sheet 112)
(Joins sheet 120)
(Joins sheet 110)
Mud
Creek
Little
Scale 1:15 840
1 Mile
5 000 Feet


N
(Joins sheet 103)
R 14 W
R 13 W
(Joins sheet 111)
(Joins sheet 113)
(Joins sheet 121)
T 25 N
Scale 1:15 840
1 Mile
5 000 Feet
1
2
5
6
7
8
11
12
91A
91B
235
238
189A
69
102
295A

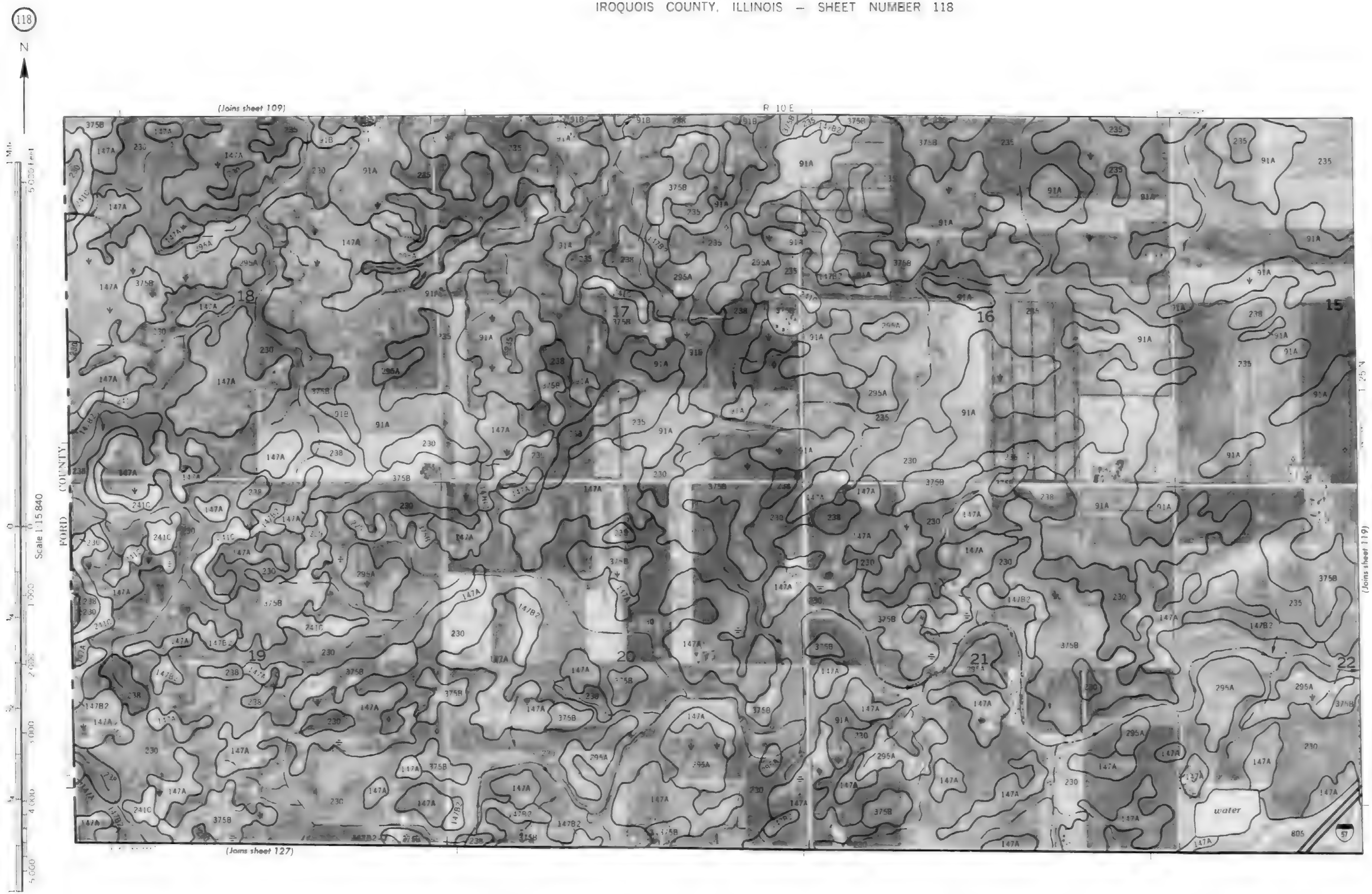

N
R. 13 W.
(Joins sheet 104)
(Joins sheet 114)
(Joins sheet 122)
(Joins sheet 112)
T. 25 N.
Woodworth
Idaville Corner
1 Mile
5000 Feet
Scale 1:15 840


N
(Joins sheet 105)
(Joins sheet 113)
(Joins sheet 115)
(Joins sheet 123)
R 13 W
R 12 W
Bryce
Creek
Scale 1:15 840
1 Mile
5 000 Feet


N
R 12 W
(Joins sheet 106)
(Joins sheet 116)
(Joins sheet 124)
(Joins sheet 114)
Scale 1:15 840
5000 Feet
Sugar
Creek
Milford Airport
MILFORD
water


N
Scale 1:15 840
R 11 W
(Joins sheet 107)
(Joins sheet 115)
(Joins sheet 117)
(Joins sheet 125)
Cutmer
Sugar Creek

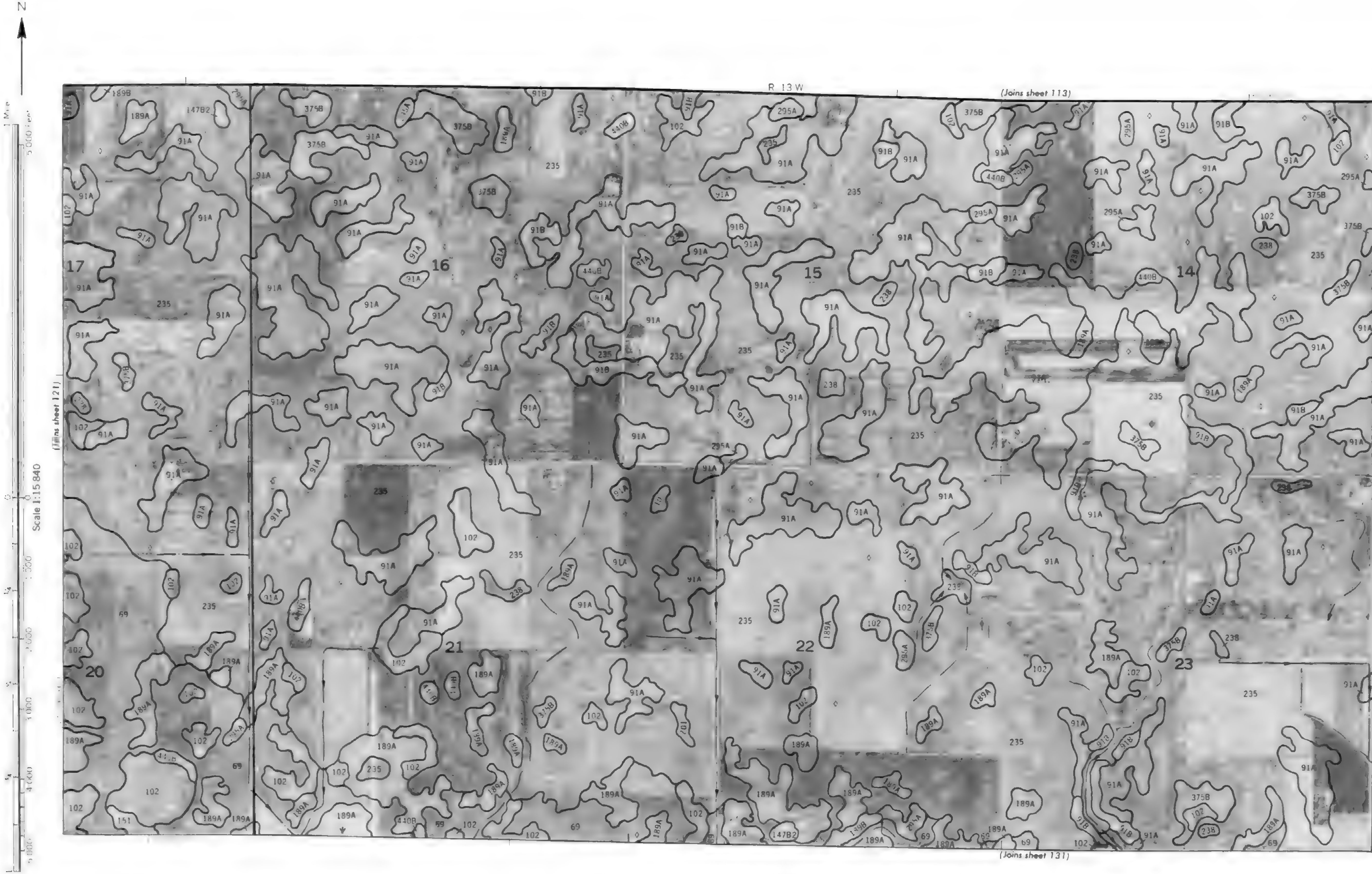

117
N
(Joins sheet 108)
R 11 W | R 10 W
T 25 N
(Joins sheet 116)
(Joins sheet 126)
INDIANA
BENTON COUNTY
Sugar Creek
Mud Creek
water
Scale 1:15 840

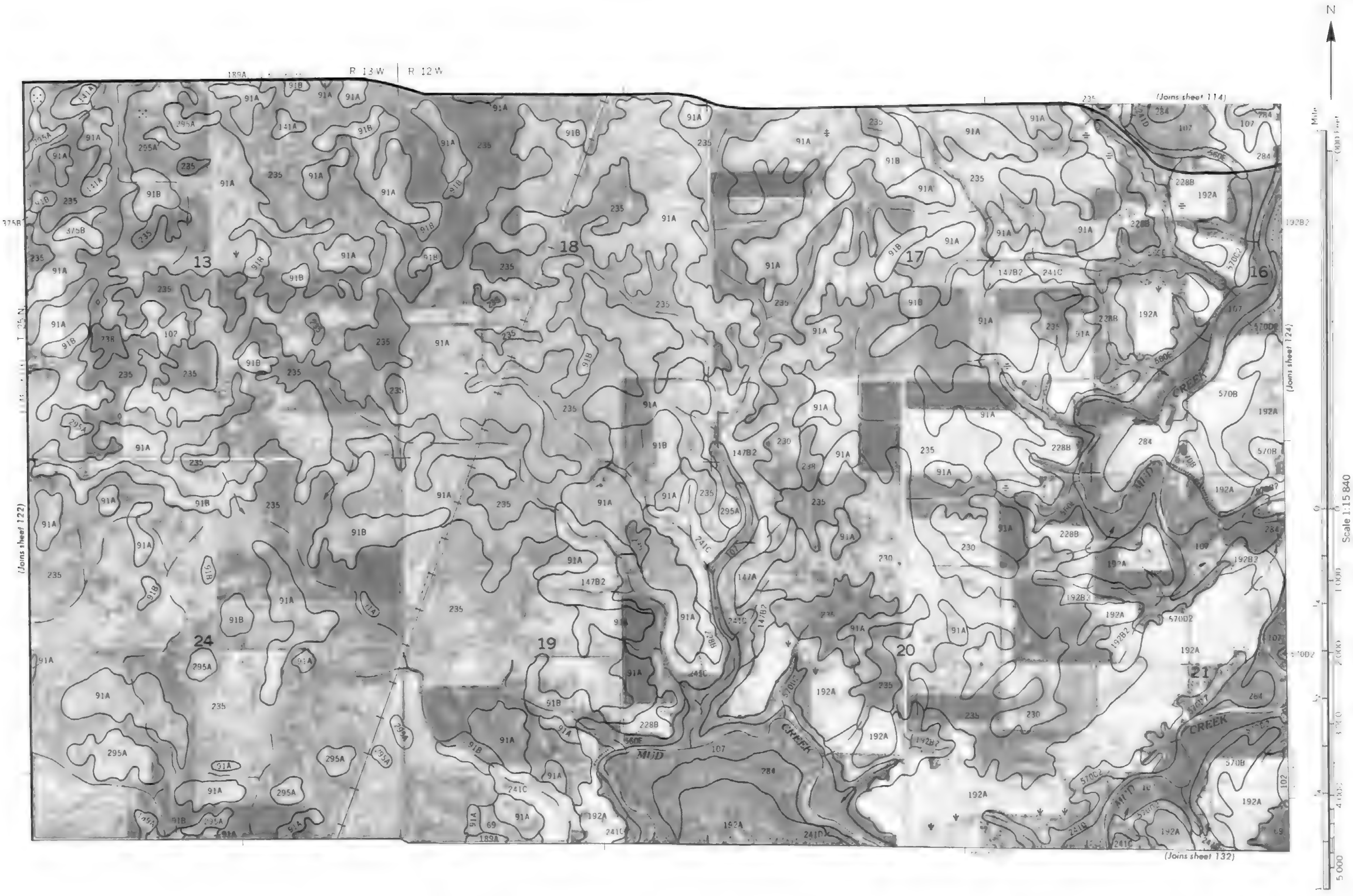

118
N
(Joins sheet 109)
R 10 E
(Joins sheet 127)
(Joins sheet 119)
FORD COUNTY
Scale 1:15 840
water
15
16
17
18
19
20
21
22

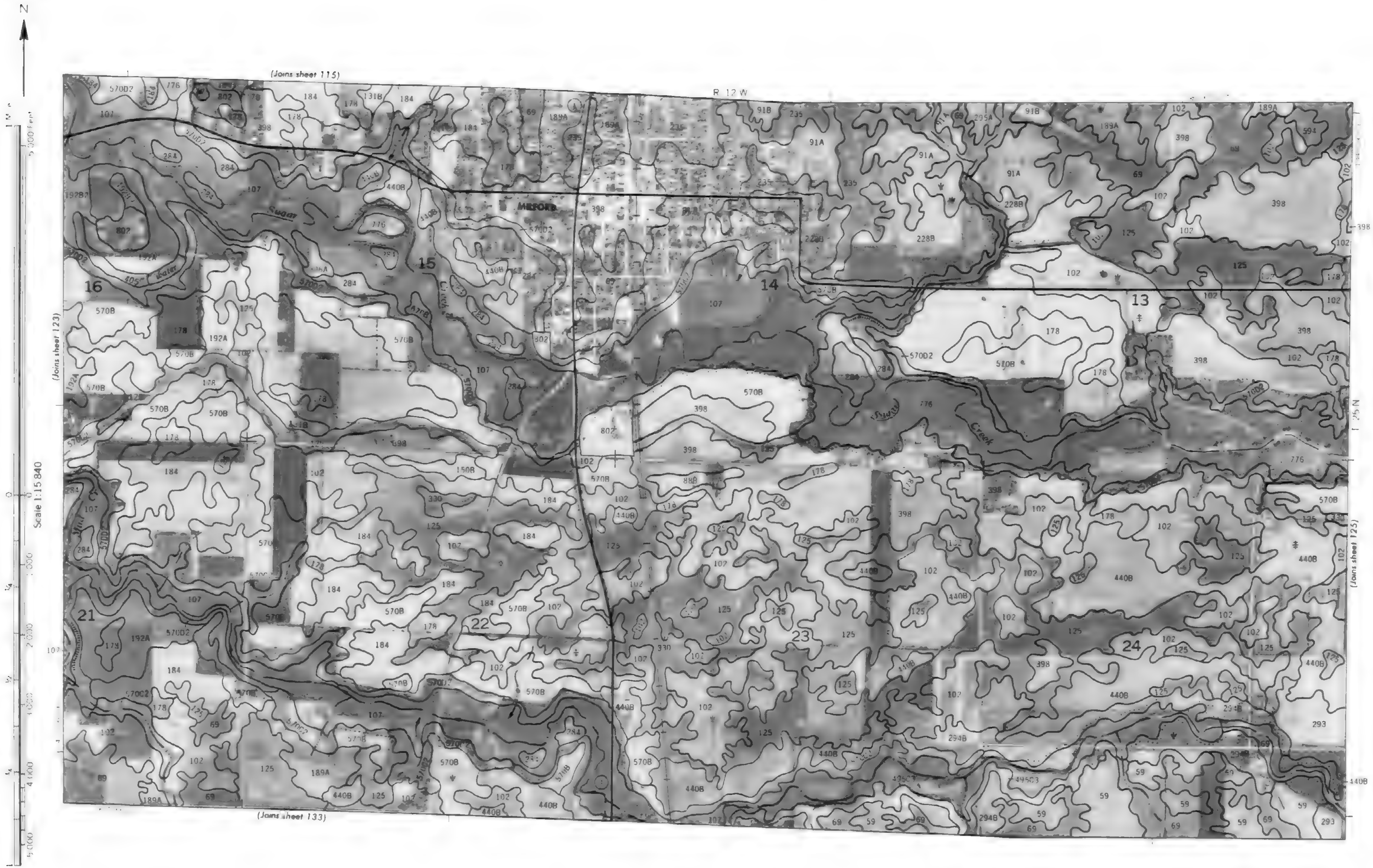

119
N
R 10 E. | R 11 E
(Joins sheet 110)
R 11 E | R 14 W
(Joins sheet 118)
(Joins sheet 120)
(Joins sheet 128)
15
14
13
18
22
23
24
19
Louis
Creek
Spring
1 Mile
5 000 Feet
Scale 1:15 840

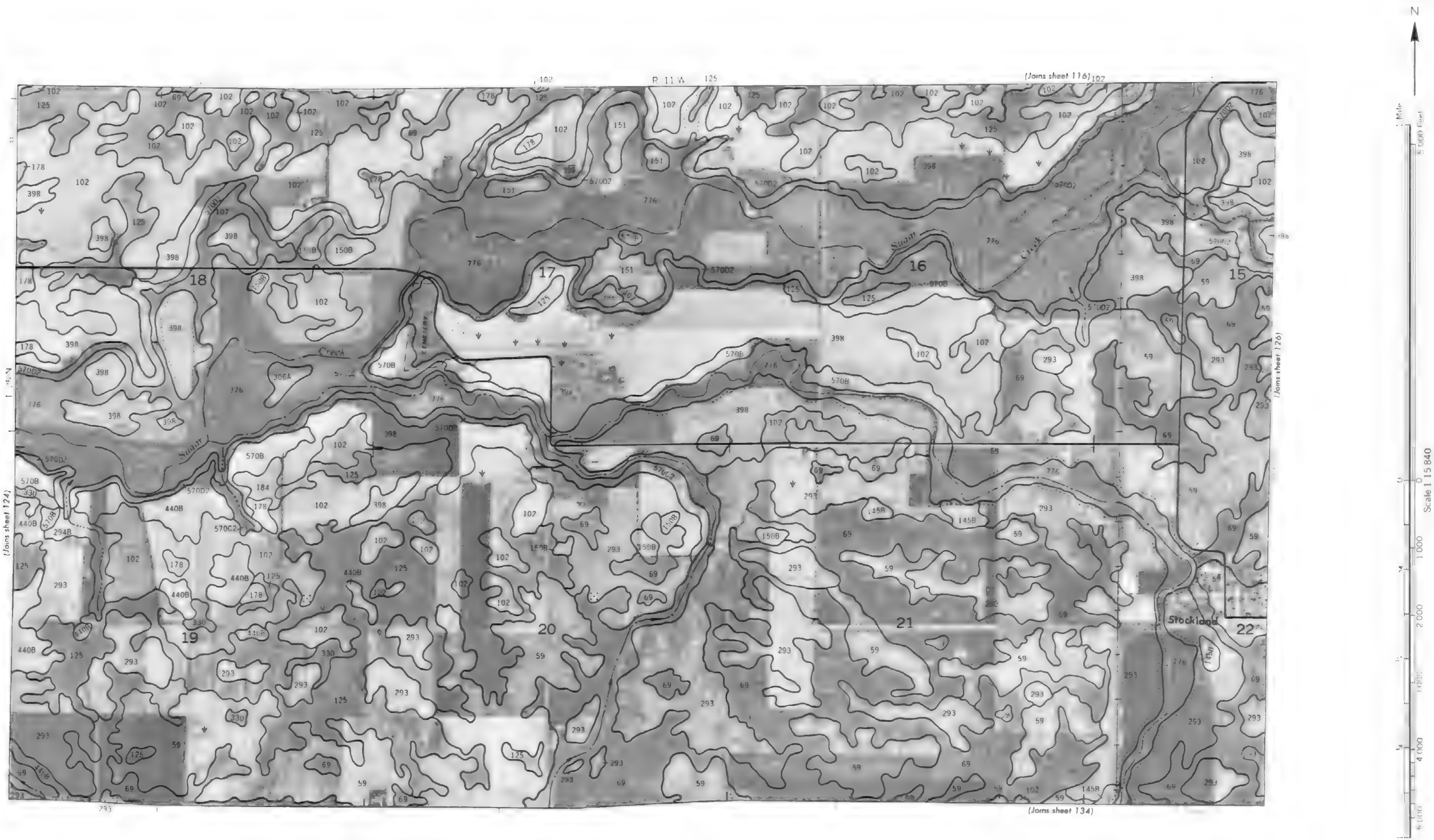

120
N
1 Mile
5 000 Feet
Scale 1:15 840
(Joins sheet 111)
R 14 W
(Joins sheet 119)
(Joins sheet 121)
(Joins sheet 129)
T 25 N
18
17
16
15
19
20
21
22
Mud
Creek
Little


N
R. 14 W. | R. 13 W.
(Joins sheet 112)
(Joins sheet 120)
(Joins sheet 122)
(Joins sheet 130)
T. 25 N.
KELLART LAKE
Ash Grove
Little Mud Creek
Scale 1:15 840


N
1 Mile
Scale 1:15 840
R 13 W
(Joins sheet 113)
(Joins sheet 121)
(Joins sheet 123)
(Joins sheet 131)
T 25 N
17
16
15
14
20
21
22
23

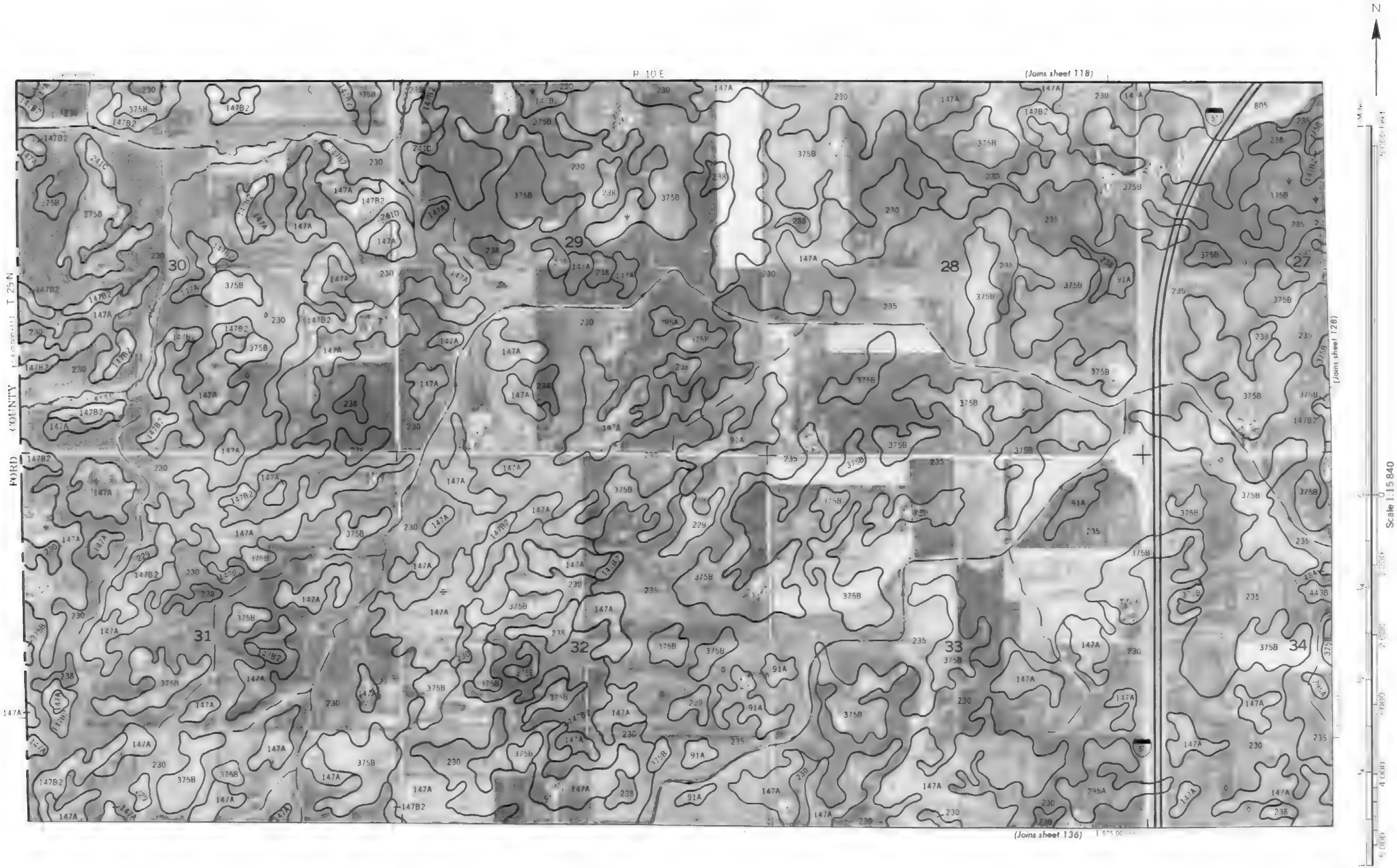

N
R 13 W
R 12 W
T 25 N
(Joins sheet 114)
(Joins sheet 124)
(Joins sheet 132)
(Joins sheet 122)
13
18
17
16
24
19
20
21
MUD CREEK
MUD CREEK
MUD CREEK
Scale 1:15 840
Mile
Feet
0
1000
2000
3000
4000
5000

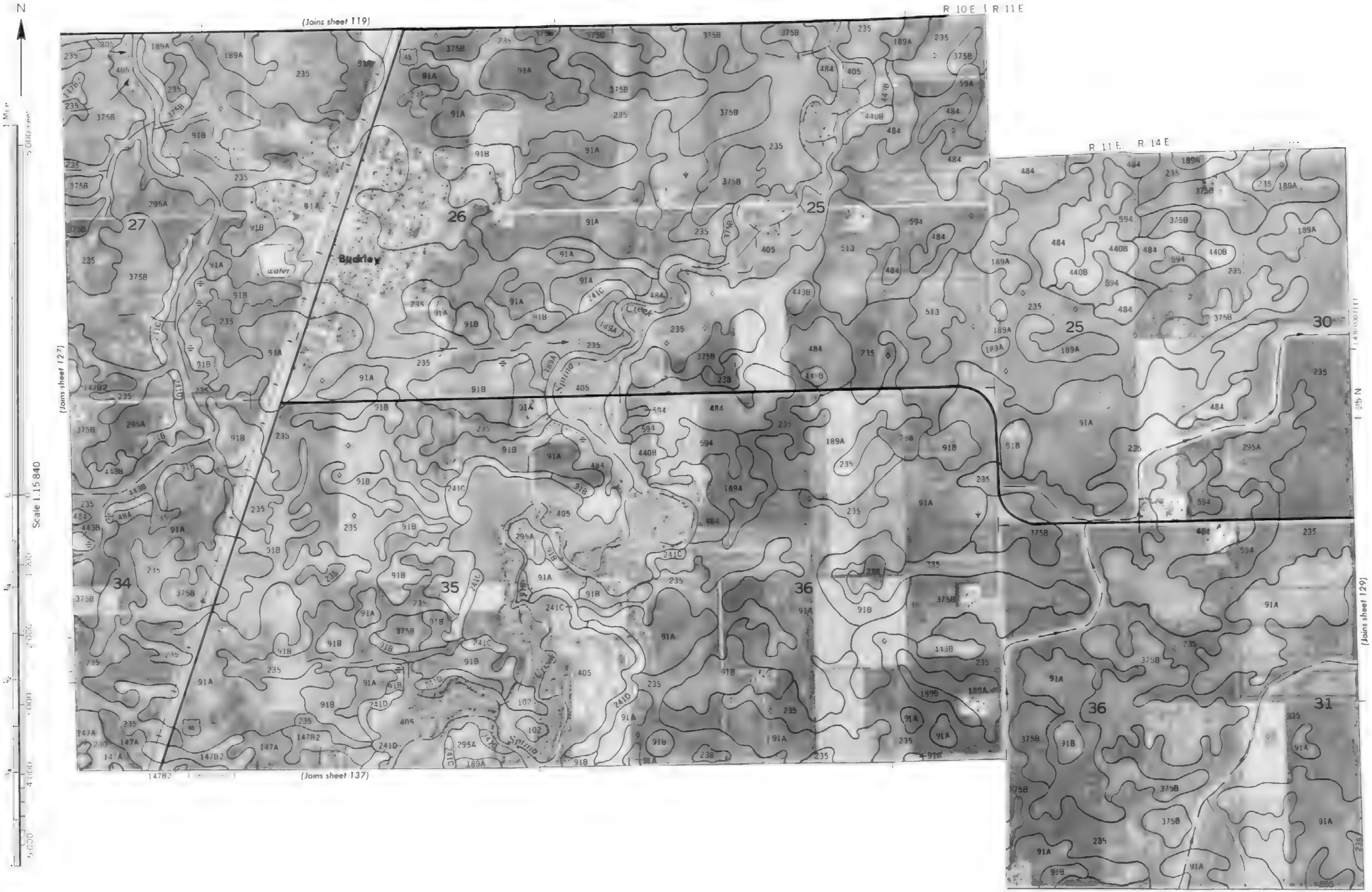

N
(Joins sheet 115)
R. 12 W.
(Joins sheet 123)
(Joins sheet 125)
(Joins sheet 133)
T. 25 N.
MILFORD
Sugar
Creek
Scale 1:15 840
16
15
14
13
21
22
23
24


N
R. 11 W.
T. 25 N.
(Joins sheet 116)
(Joins sheet 124)
(Joins sheet 126)
(Joins sheet 134)
15
16
17
18
19
20
21
22
Sugar Creek
Creek
Cemetery
Stockland
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000

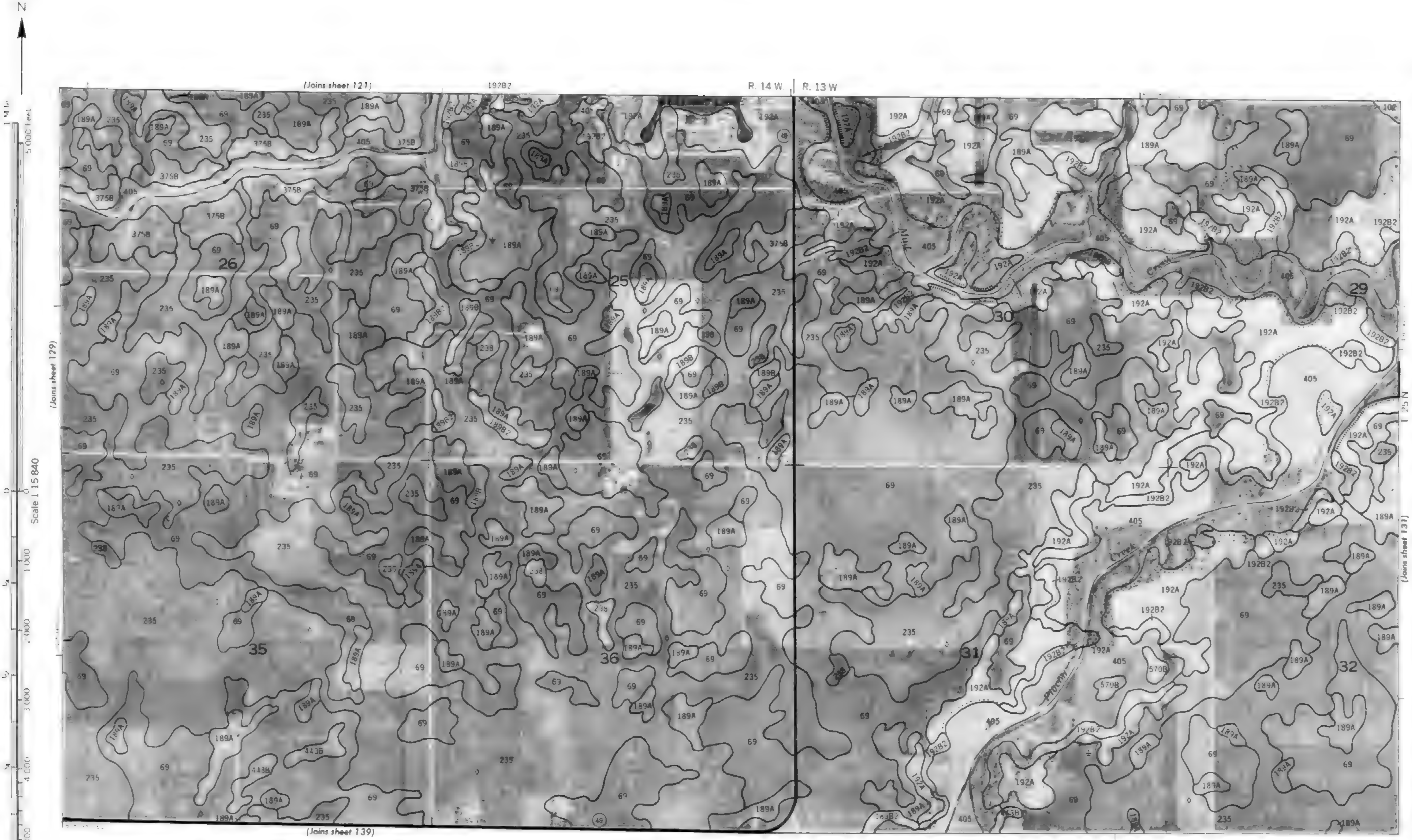
126

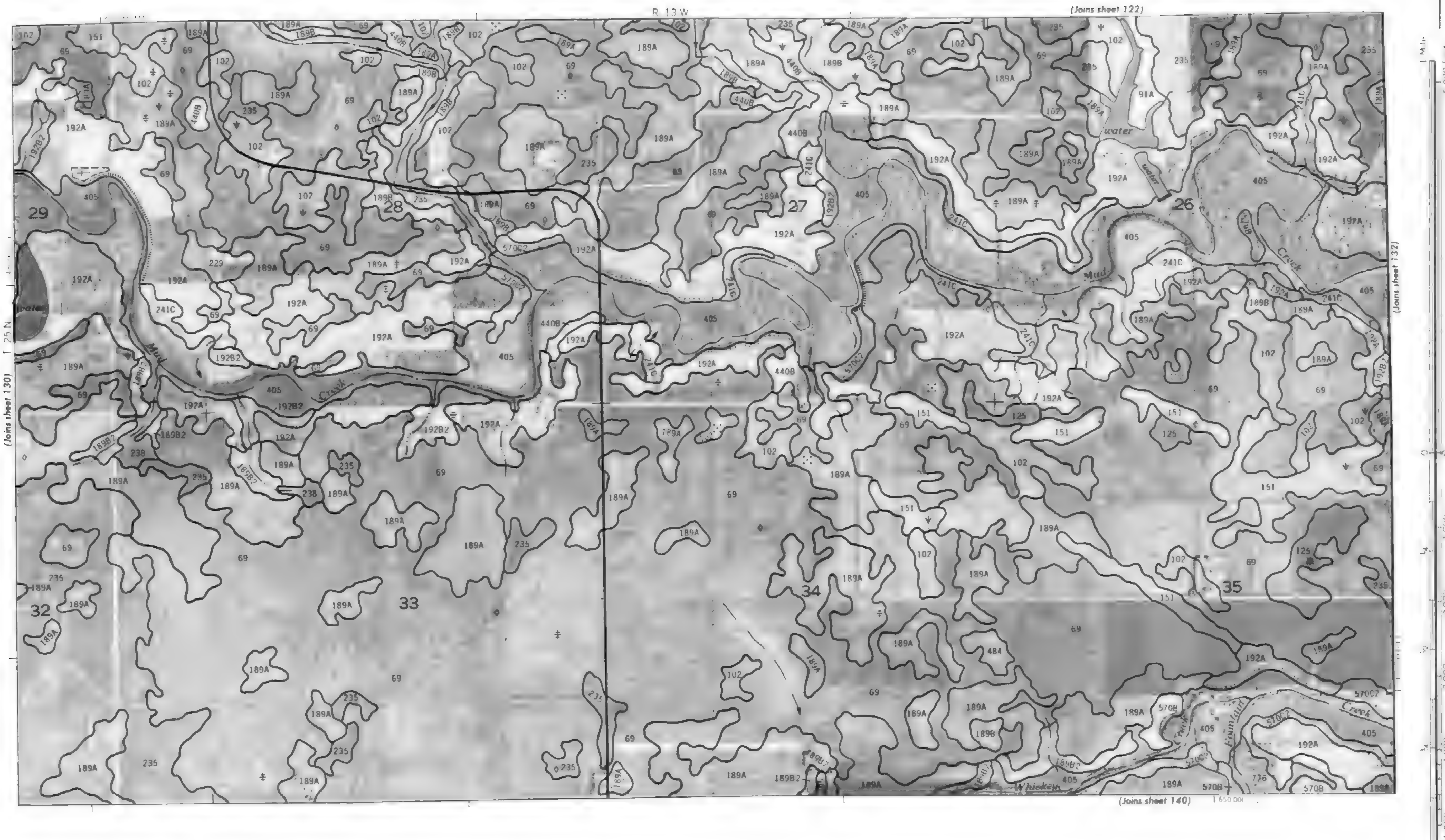

N
(Joins sheet 117)
R. 11 W
R. 10 W
(Joins sheet 125)
(Joins sheet 135)
T. 25 N
Scale 1:15 840
Mud Creek
Stockland
Dawson Park
INDIANA
BENTON COUNTY
13
14
15
18
19
22
23
24

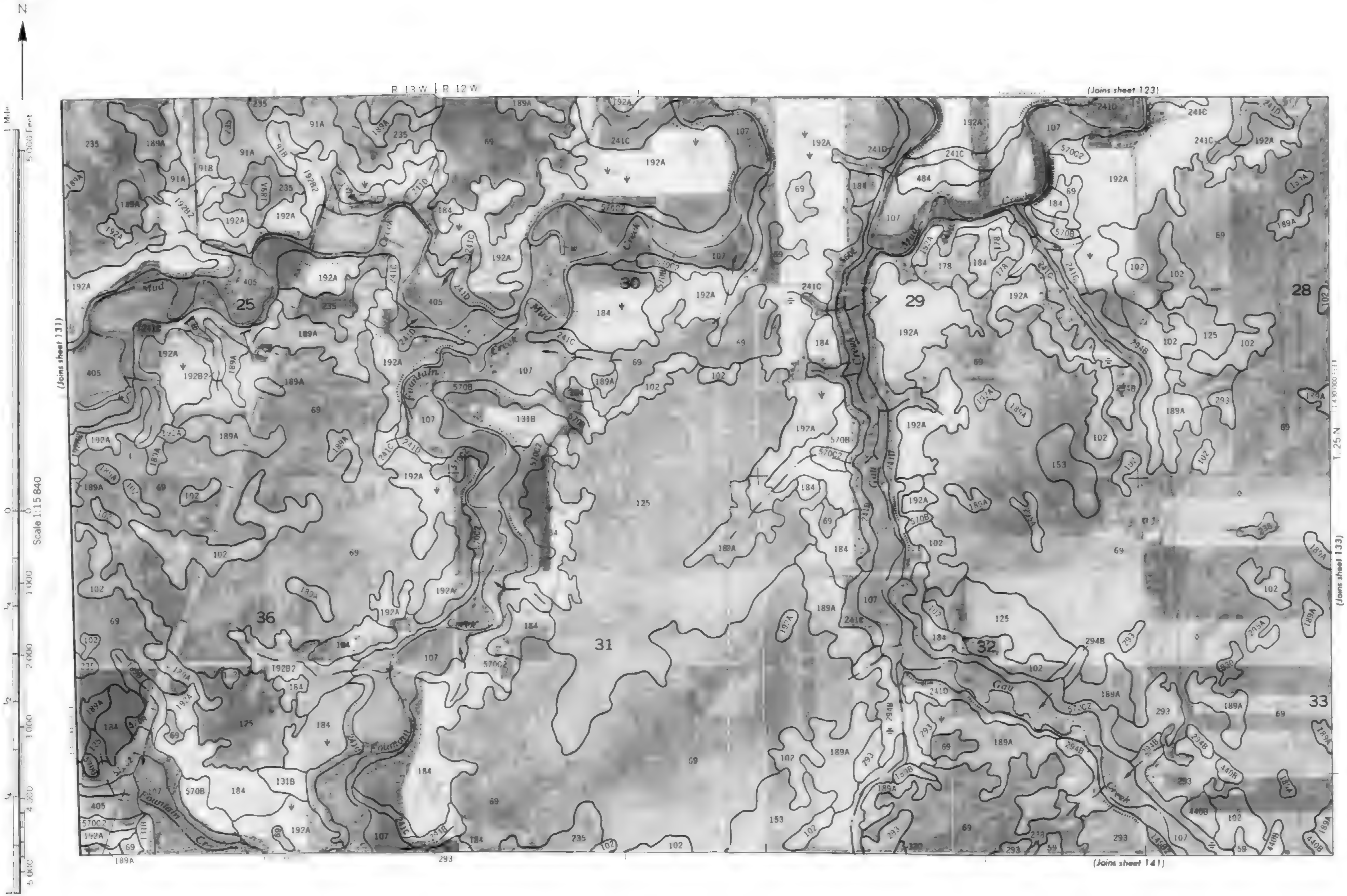

N
R 10 E
(Joins sheet 118)
(Joins sheet 128)
(Joins sheet 136)
T 25 N
FORD COUNTY
29
28
27
30
31
32
33
34
Scale 1:15 840

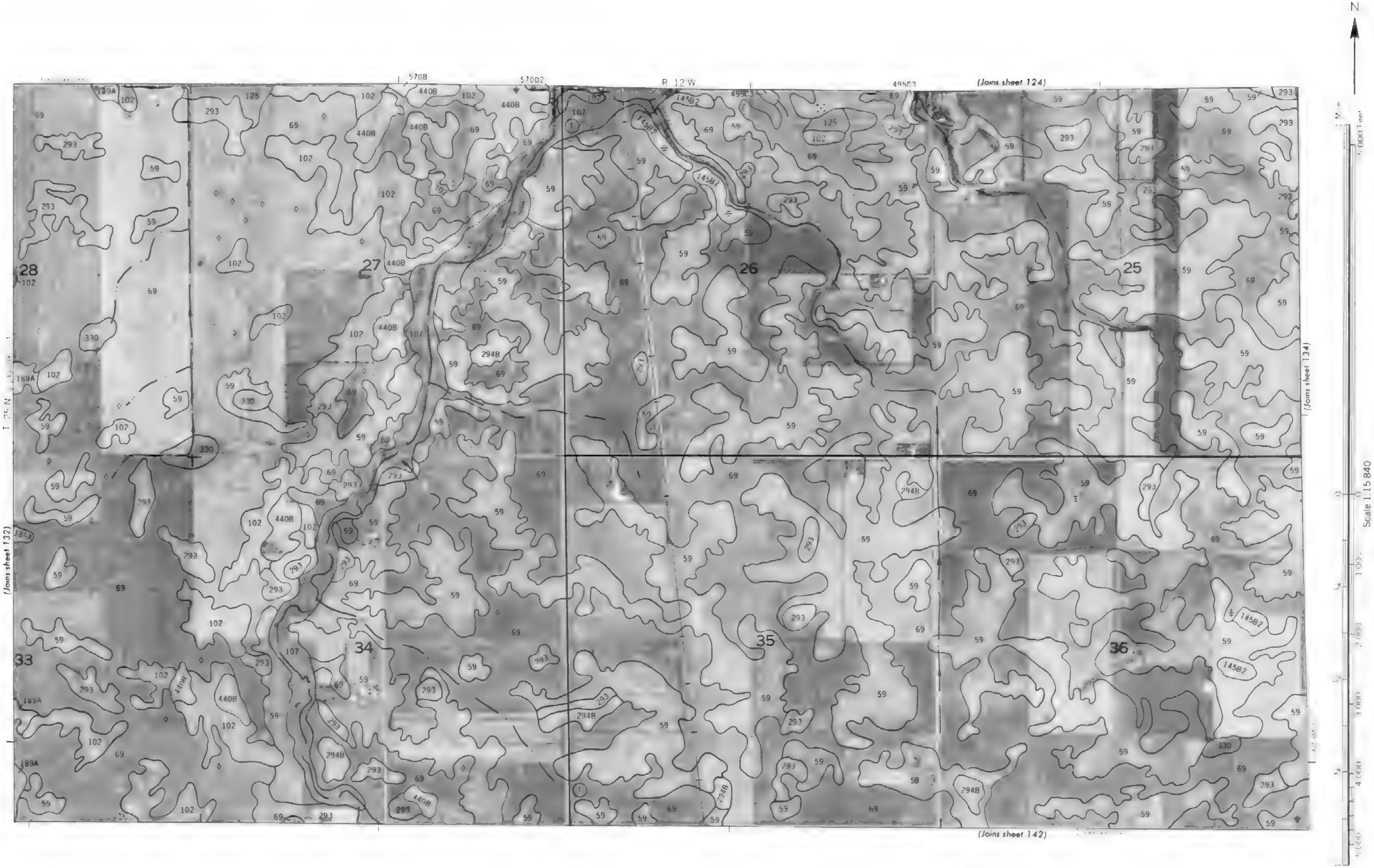

N
(Joins sheet 119)
(Joins sheet 127)
(Joins sheet 129)
(Joins sheet 137)
R 10 E | R 11 E
R 11 E. R 14 E
T 25 N
Scale 1:15 840
Buckley
water
Spring Creek
27
26
25
30
34
35
36
36
31


N
R 14 W
T 25 N
(Joins sheet 120)
(Joins sheet 130)
(Joins sheet 138)
(Joins sheet 128)
30
29
28
27
31
32
33
34
Scale 1:15 840
5 000 Feet
1 Mile

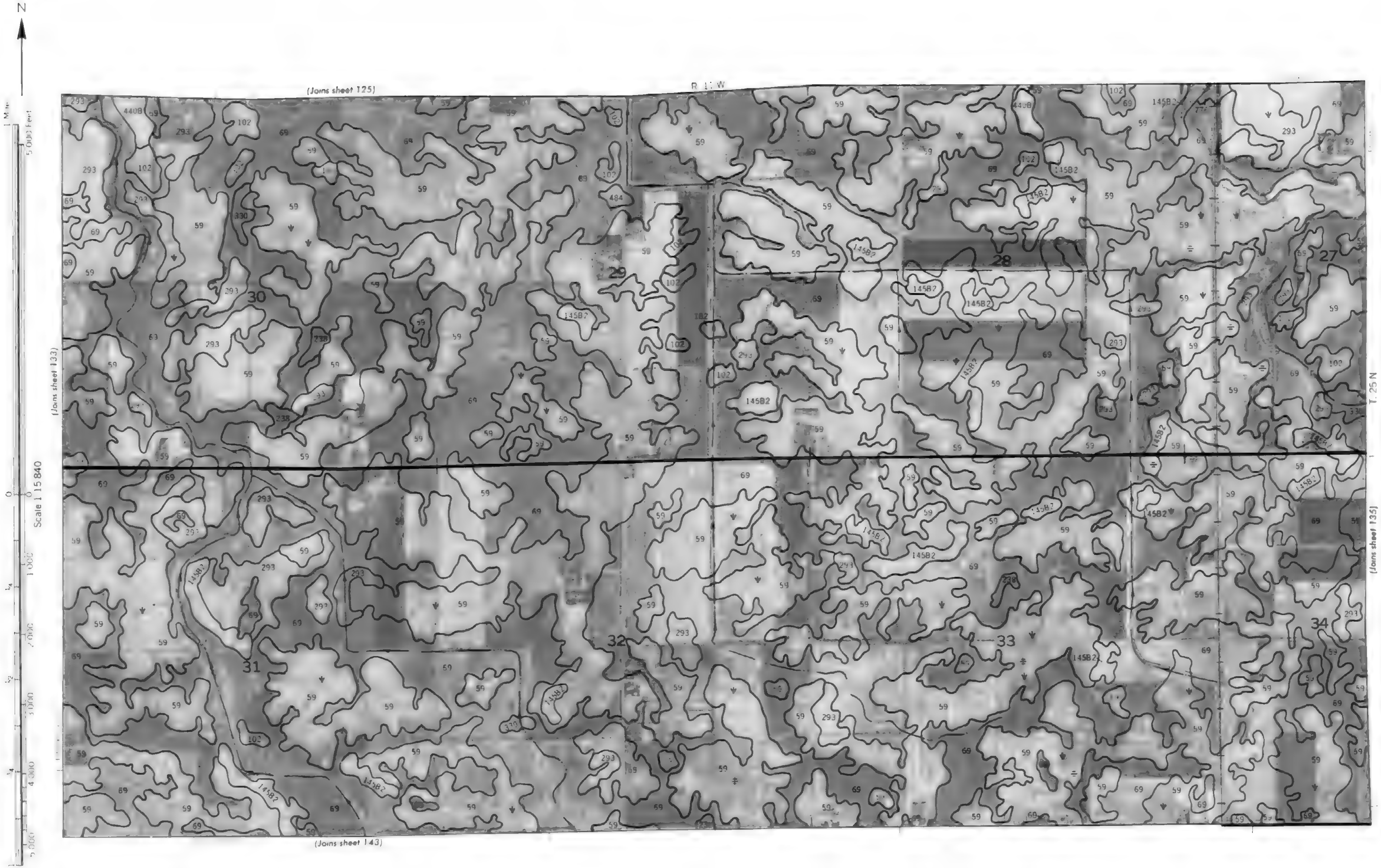

130
N
(Joins sheet 121)
R. 14 W.
R. 13 W
(Joins sheet 129)
(Joins sheet 131)
(Joins sheet 139)
T. 25 N.
Scale 1:15 840
26
25
30
29
35
36
31
32
Mud Creek
Creek
Pigeon Creek


131
N
R 13 W
(Joins sheet 122)
(Joins sheet 130)
(Joins sheet 132)
(Joins sheet 140)
T 25 N
Mud
Creek
water
Whiskey
Scale 1:15 840
1 Mile
5 000 Feet
1 000
2 000
3 000
4 000
5 000
29
28
27
26
32
33
34
35

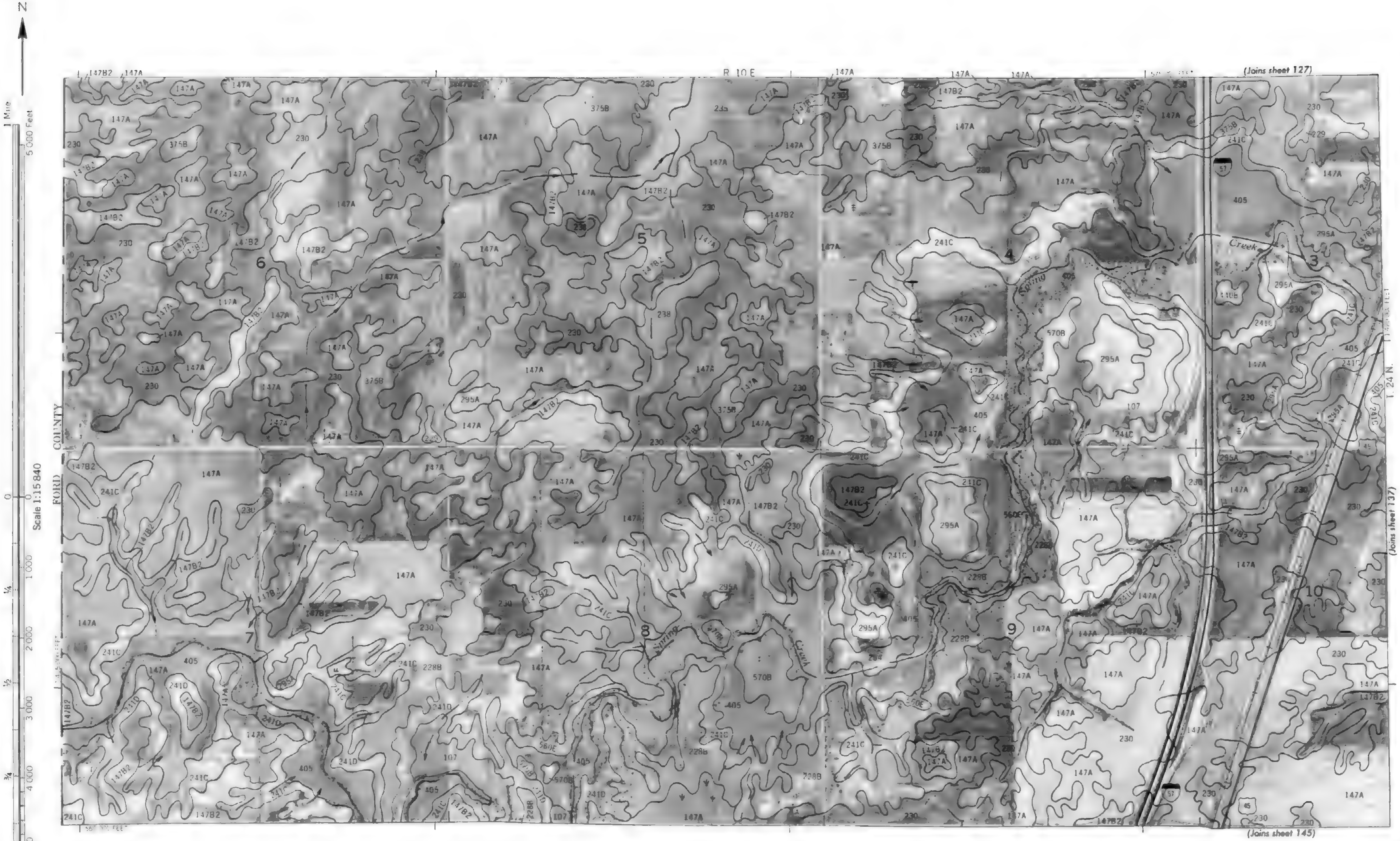

N
1 Mile
5 000 Feet
Scale 1:15 840
R. 13 W. | R. 12 W.
(Joins sheet 123)
(Joins sheet 131)
(Joins sheet 133)
(Joins sheet 141)
T. 25 N.
25
28
29
30
31
32
33
36
Mud Creek
Fountain Creek
Gay Creek

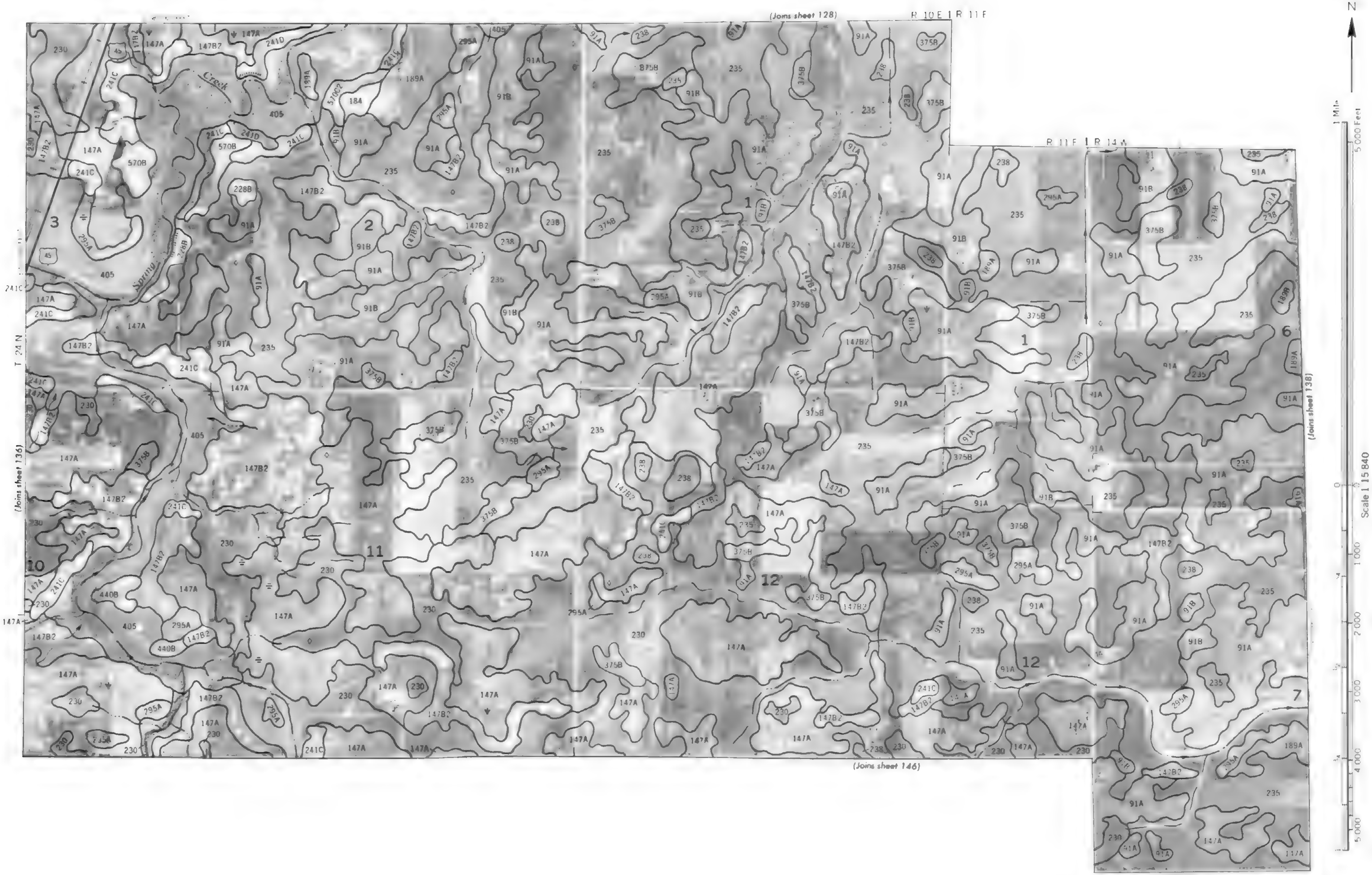

N
R. 12 W.
(Joins sheet 124)
(Joins sheet 134)
(Joins sheet 142)
(Joins sheet 132)
T. 25 N.
28
27
26
25
33
34
35
36
Scale 1:15 840

IROQUOIS COUNTY, ILLINOIS — SHEET NUMBER 134



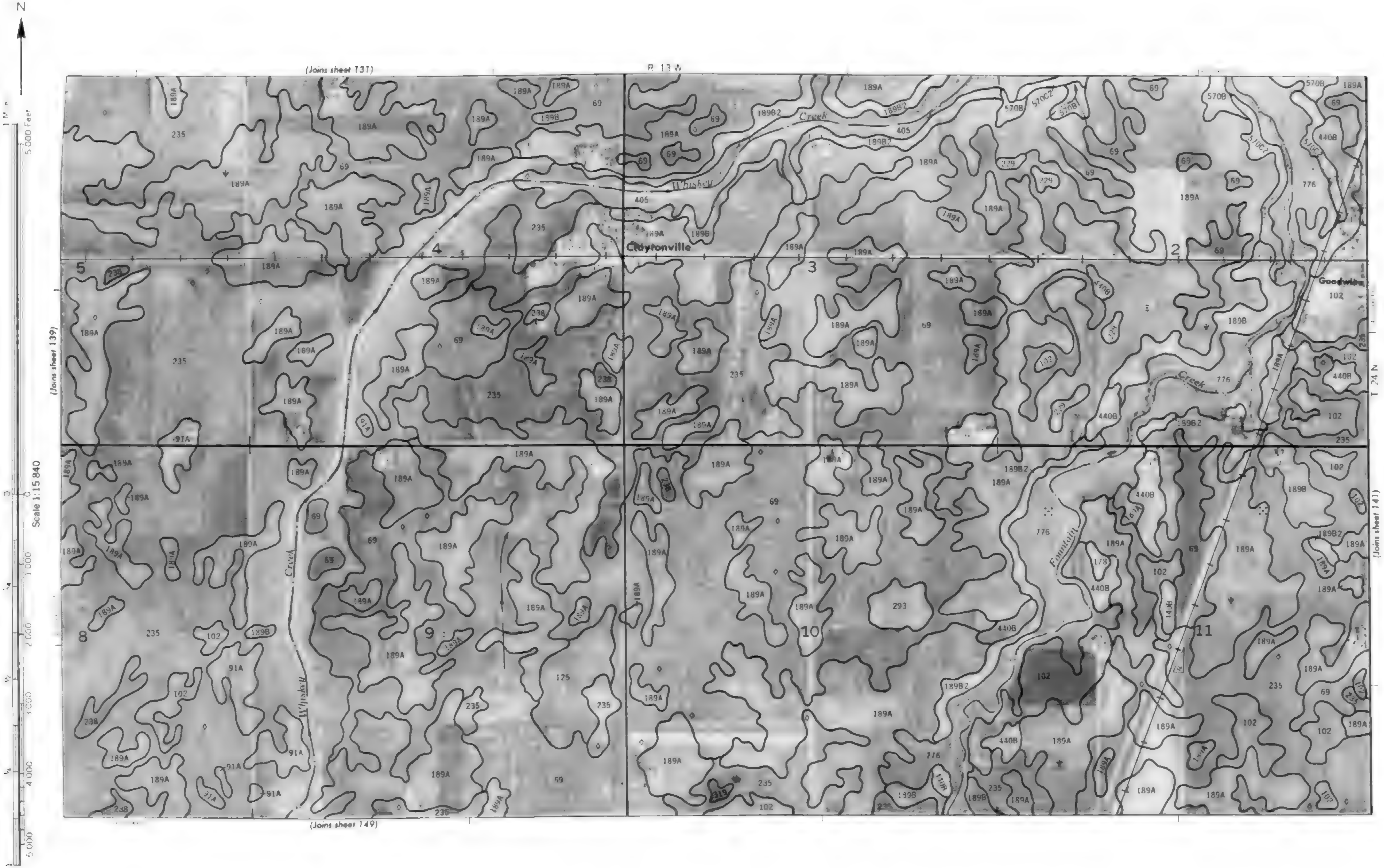

135
N
R. 11 W.
R. 10 W.
(Joins sheet 126)
(Joins sheet 134)
(Joins sheet 144)
T. 25 N.
INDIANA
BENTON COUNTY
Scale 1:15 840
5 000 Feet
1 Mile
25
26
27
30
31
34
35
36
59
69
293
145B2
330

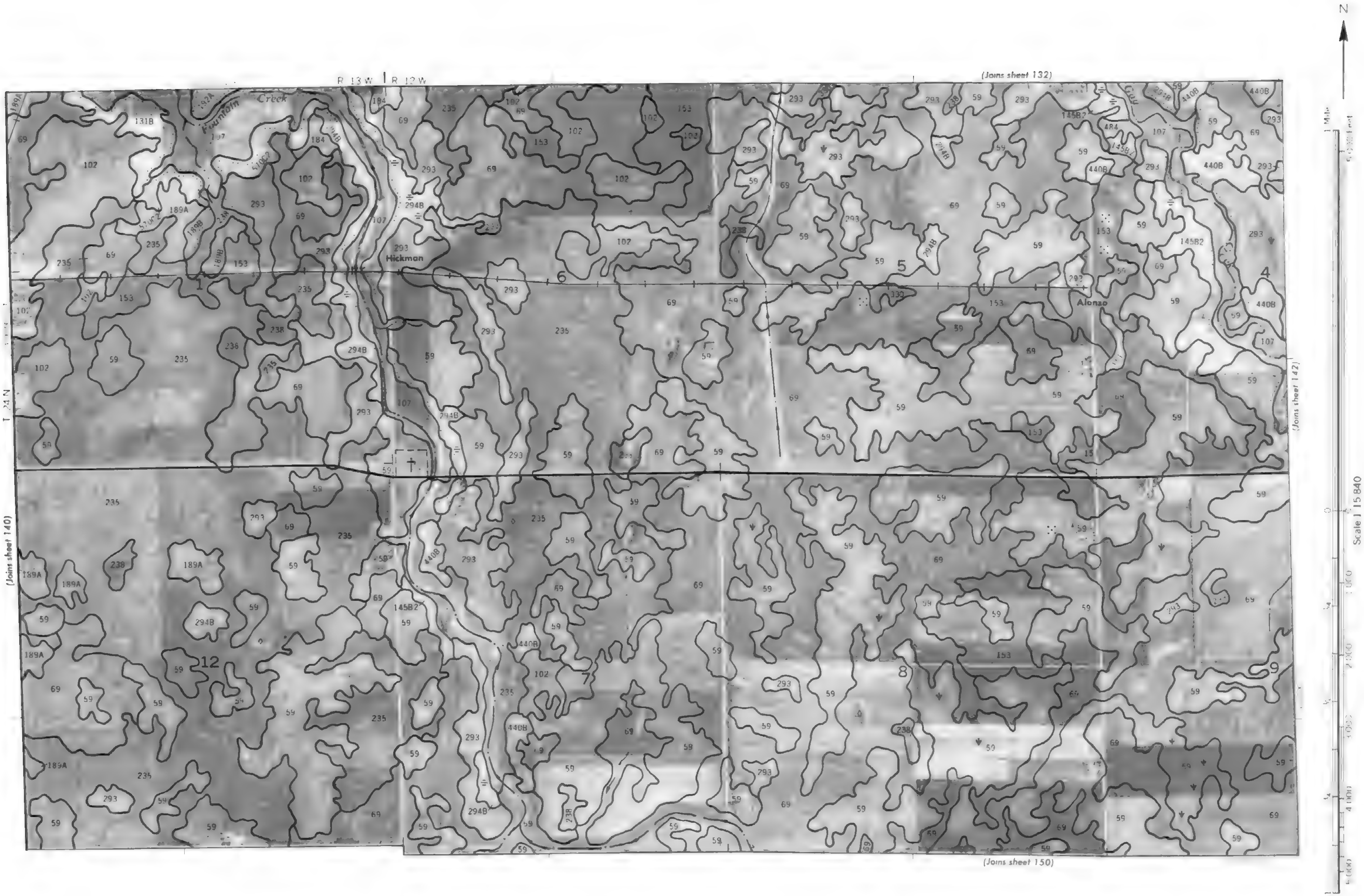

N
1 Mile
5 000 Feet
Scale 1:15 840
R. 10 E.
T. 24 N.
FORD COUNTY
(Joins sheet 127)
(Joins sheet 137)
(Joins sheet 145)
Spring Creek
Creek
Spring
Crook
57
45
1
2
3
4
5
6
7
8
9
10
147A
147B2
230
375B
238
241C
241D
295A
405
107
570B
228B
560E


(Joins sheet 128)
R 10 E | R 11 E
R 11 E | R 14 W
T 24 N
(Joins sheet 136)
(Joins sheet 138)
(Joins sheet 146)
Spring
Creek
N
1 Mile
5 000 Feet
Scale 1:15 840

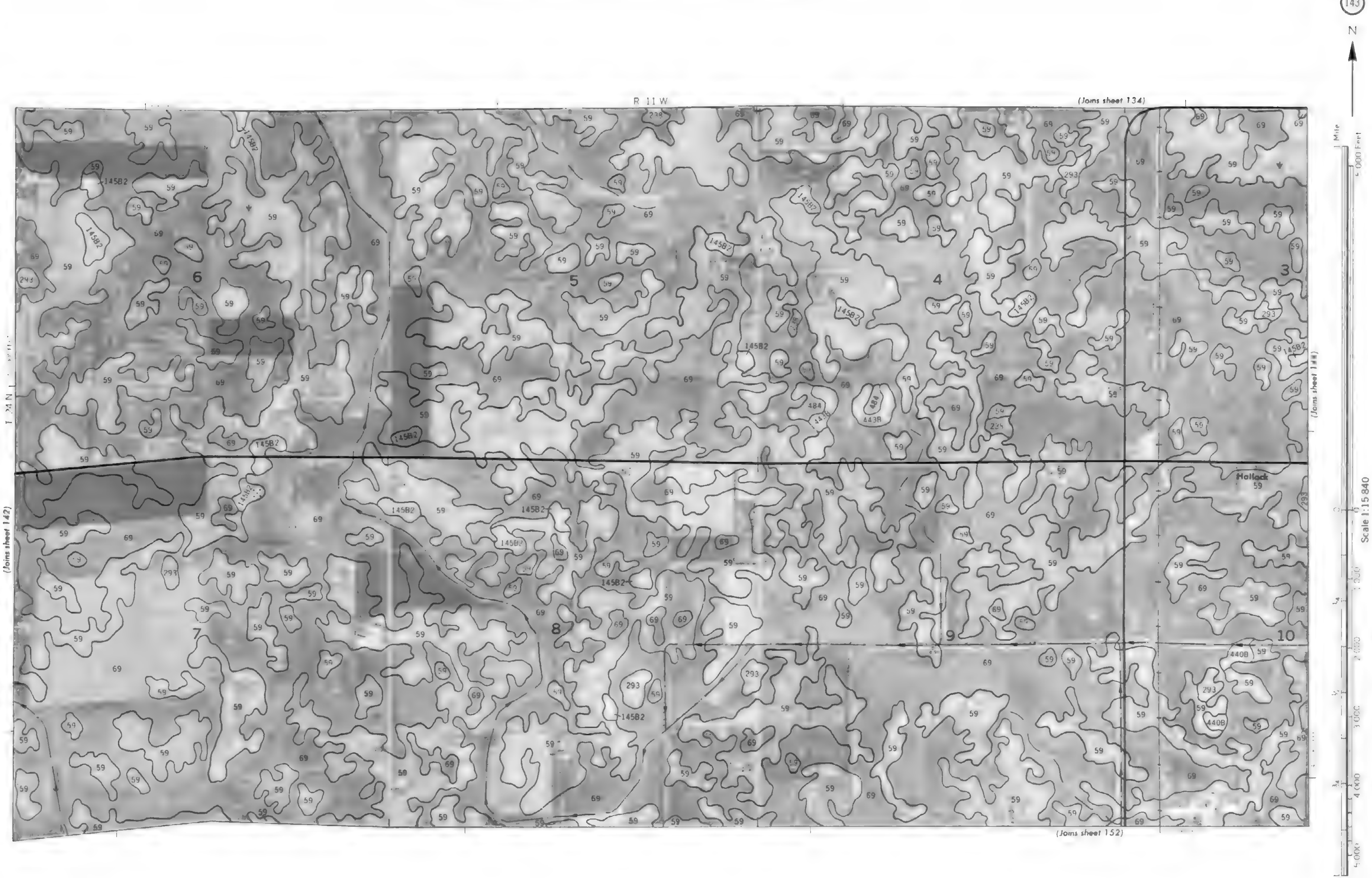

138
N
(Joins sheet 129)
R. 14 W.
(Joins sheet 137)
(Joins sheet 139)
(Joins sheet 147)
T. 24 N.
Scale 1:15 840
1 Mile
5 000 Feet
0
1 000
2 000
3 000
4 000
5 000
3
4
5
6
7
8
9
10

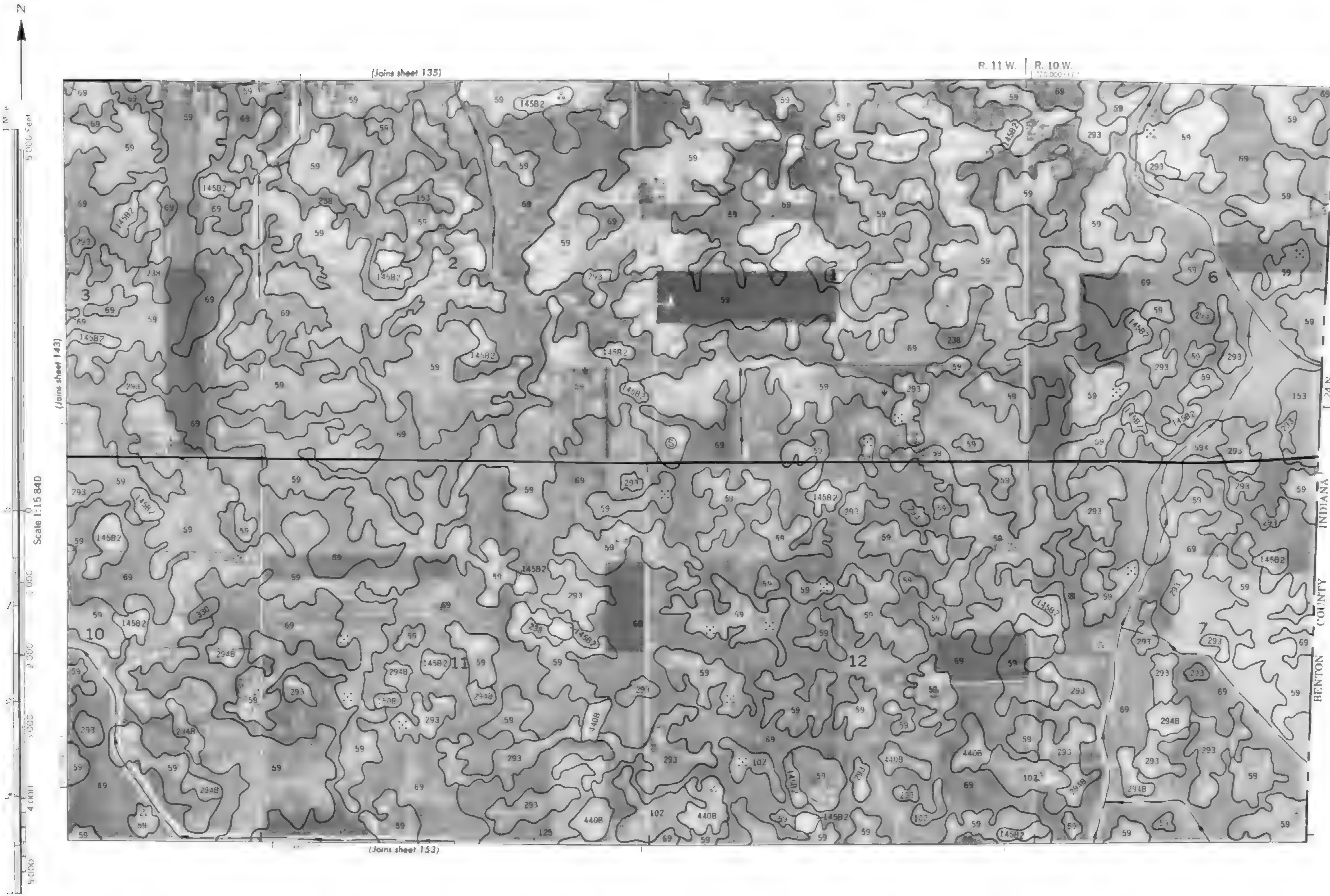

139
N
R. 14 W.
R. 13 W.
(Joins sheet 130)
(Joins sheet 140)
(Joins sheet 148)
(Joins sheet 138)
T. 24 N.
Pigeon
Creek
Scale 1:15 840
5 000 Feet

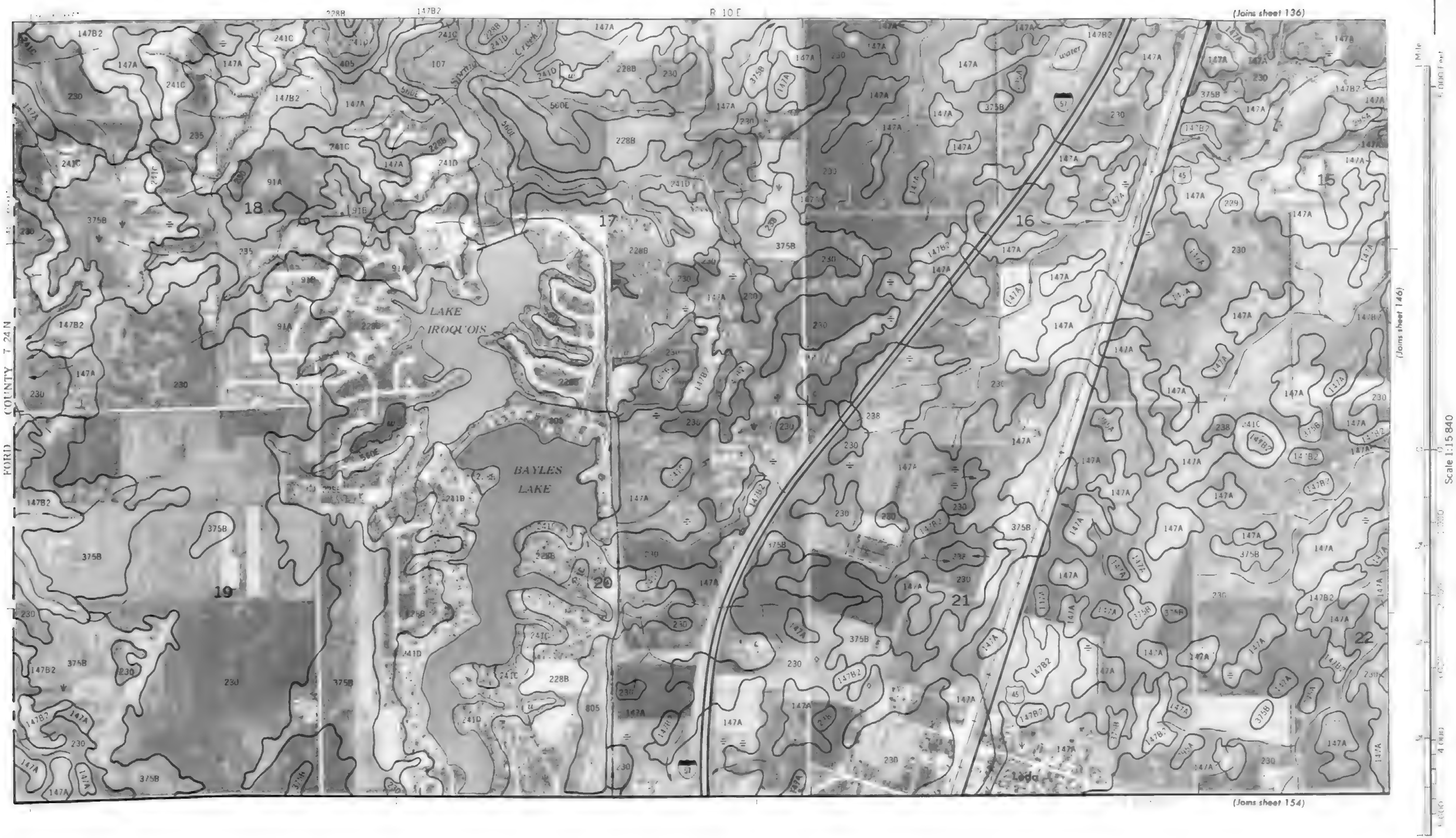

N
Scale 1:15 840
5 000 Feet
(Joins sheet 131)
R. 13 W.
Claytonville
Goodwine
Whiskey Creek
Fountain Creek
T. 24 N.
(Joins sheet 139)
(Joins sheet 141)
(Joins sheet 149)

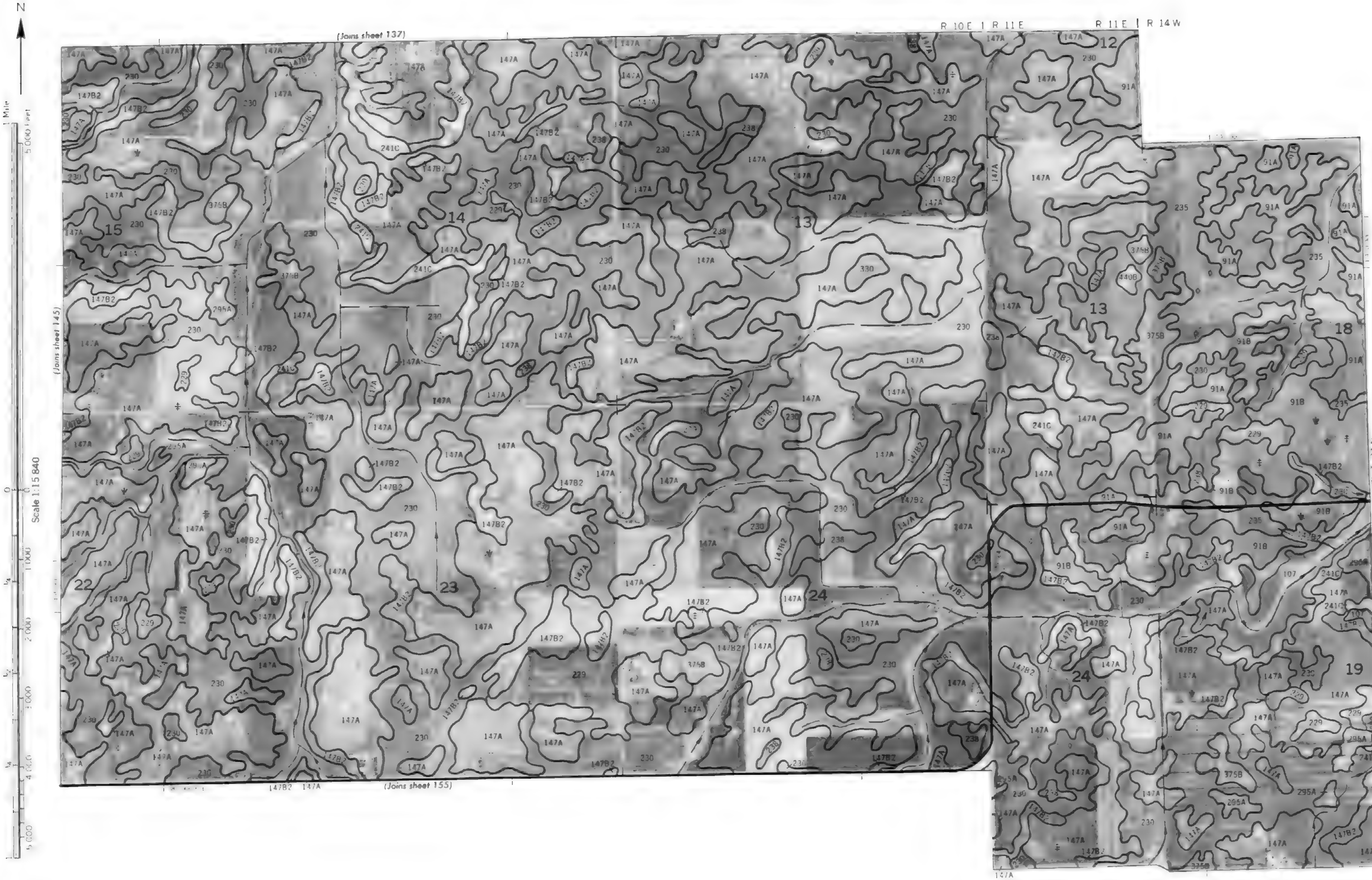

N
(Joins sheet 132)
(Joins sheet 142)
(Joins sheet 150)
(Joins sheet 140)
R 13 W
R 12 W
T 24 N
Fountain Creek
Hickman
Alonzo
1 Mile
5000 Feet
Scale 1:15 840

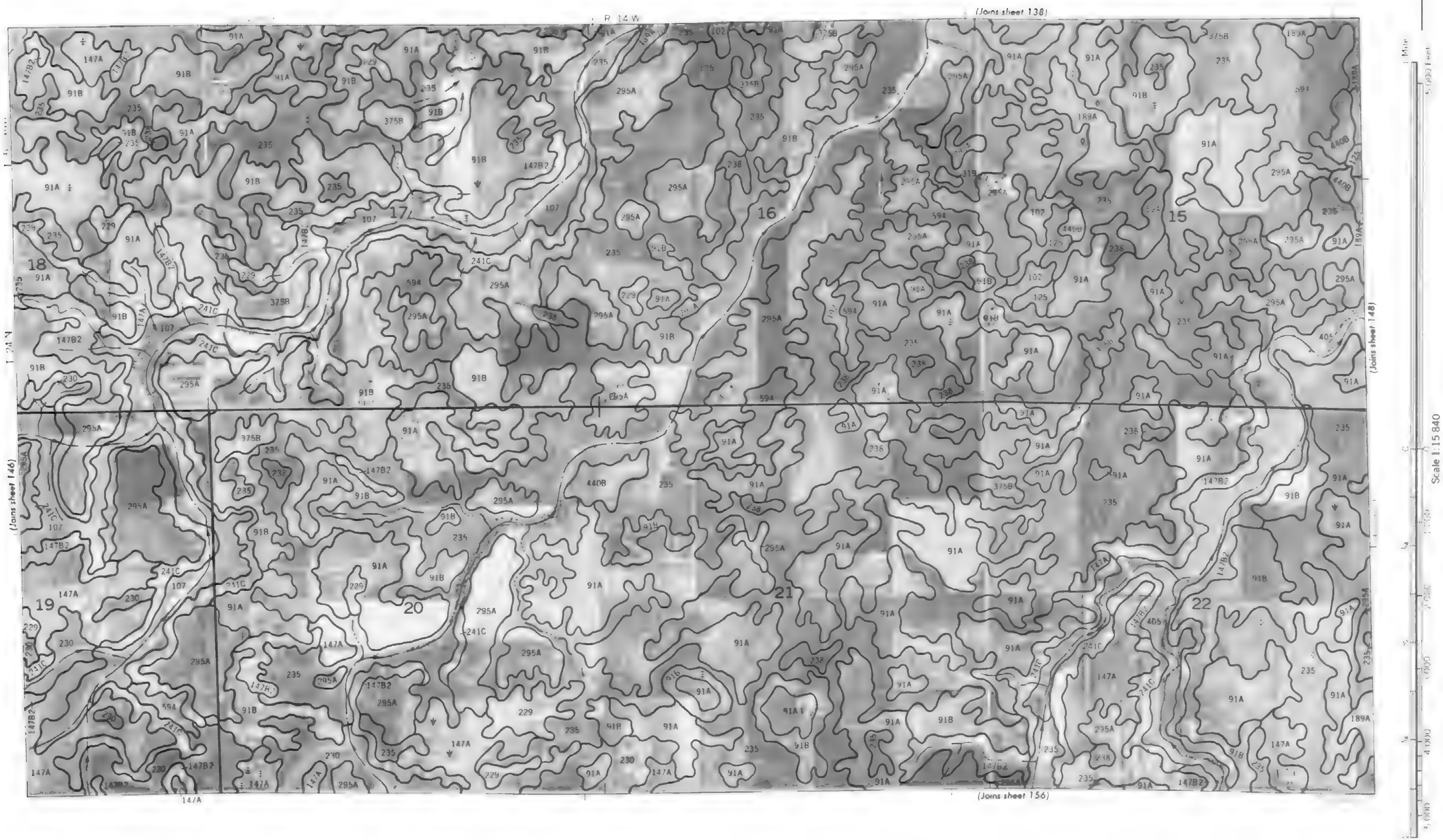

N
(Joins sheet 133)
R. 12 W.
(Joins sheet 141)
(Joins sheet 143)
(Joins sheet 151)
T. 24 N.
Scale 1:15 840
1 Mile
5 000 Feet
Gay Creek


143
N
R 11 W
(Joins sheet 134)
(Joins sheet 142)
(Joins sheet 144)
(Joins sheet 152)
T 24 N
6
5
4
3
7
8
9
10
Hallock
59
69
145B2
293
443B
484
440B
1 Mile
5 000 Feet
Scale 1:15 840


N
(Joins sheet 135)
R. 11 W.
R. 10 W.
(Joins sheet 143)
(Joins sheet 153)
T. 24 N.
INDIANA
BENTON COUNTY
Scale 1:15 840
1 Mile
5 000 Feet

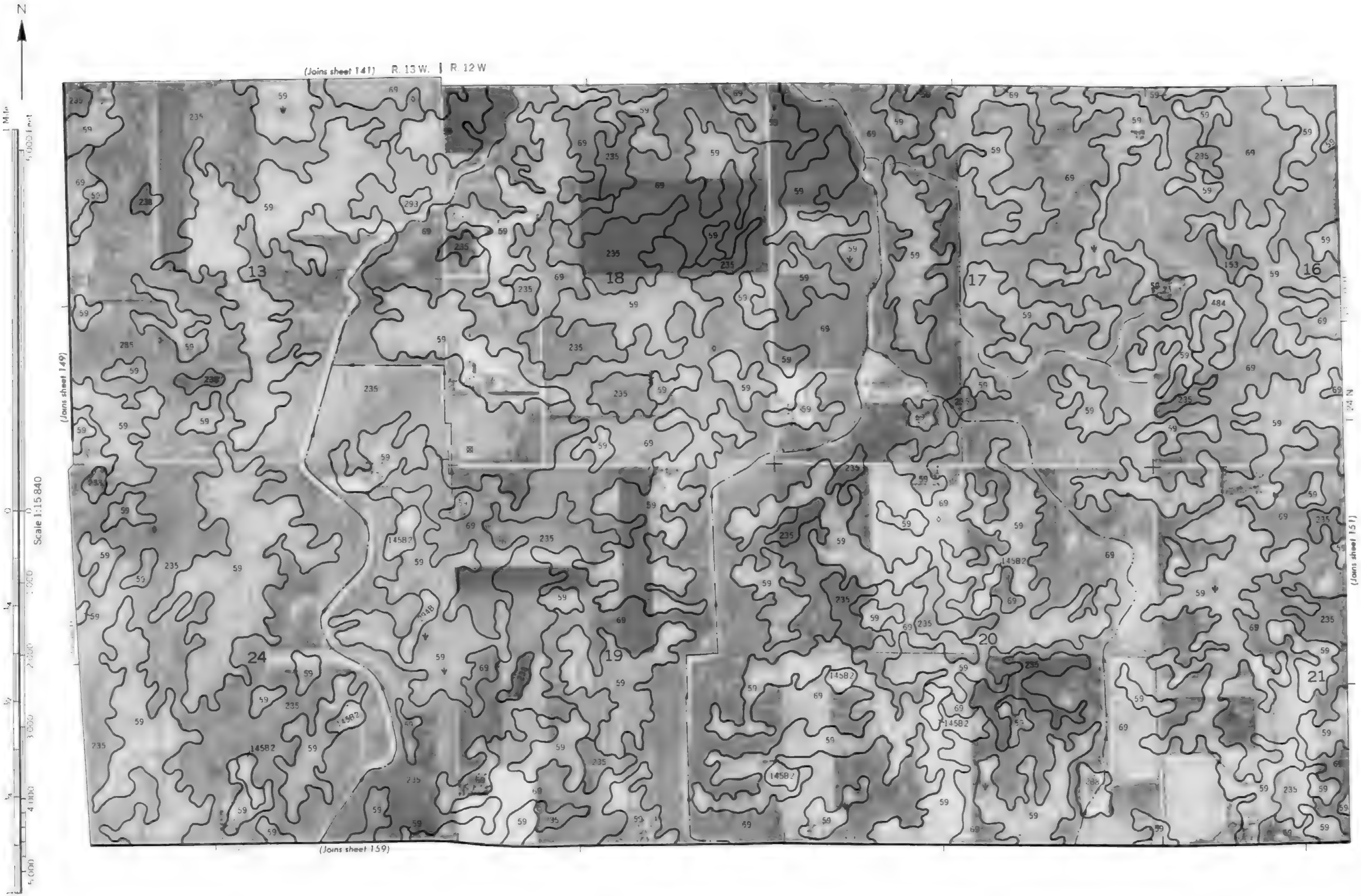

R 10 E
(Joins sheet 136)
(Joins sheet 146)
(Joins sheet 154)
FORD COUNTY
T 24 N
LAKE IROQUOIS
BAYLES LAKE
Leda
Spring Creek
water
18
17
16
15
19
20
21
22
N
1 Mile
Scale 1:15 840


N
(Joins sheet 137)
(Joins sheet 145)
(Joins sheet 147)
(Joins sheet 155)
R 10 E | R 11 E
R 11 E | R 14 W
T 24 N
1 Mile
5 000 Feet
Scale 1:15 840
0
1000
2000
3000
4000
5000
12
13
14
15
18
19
22
23
24

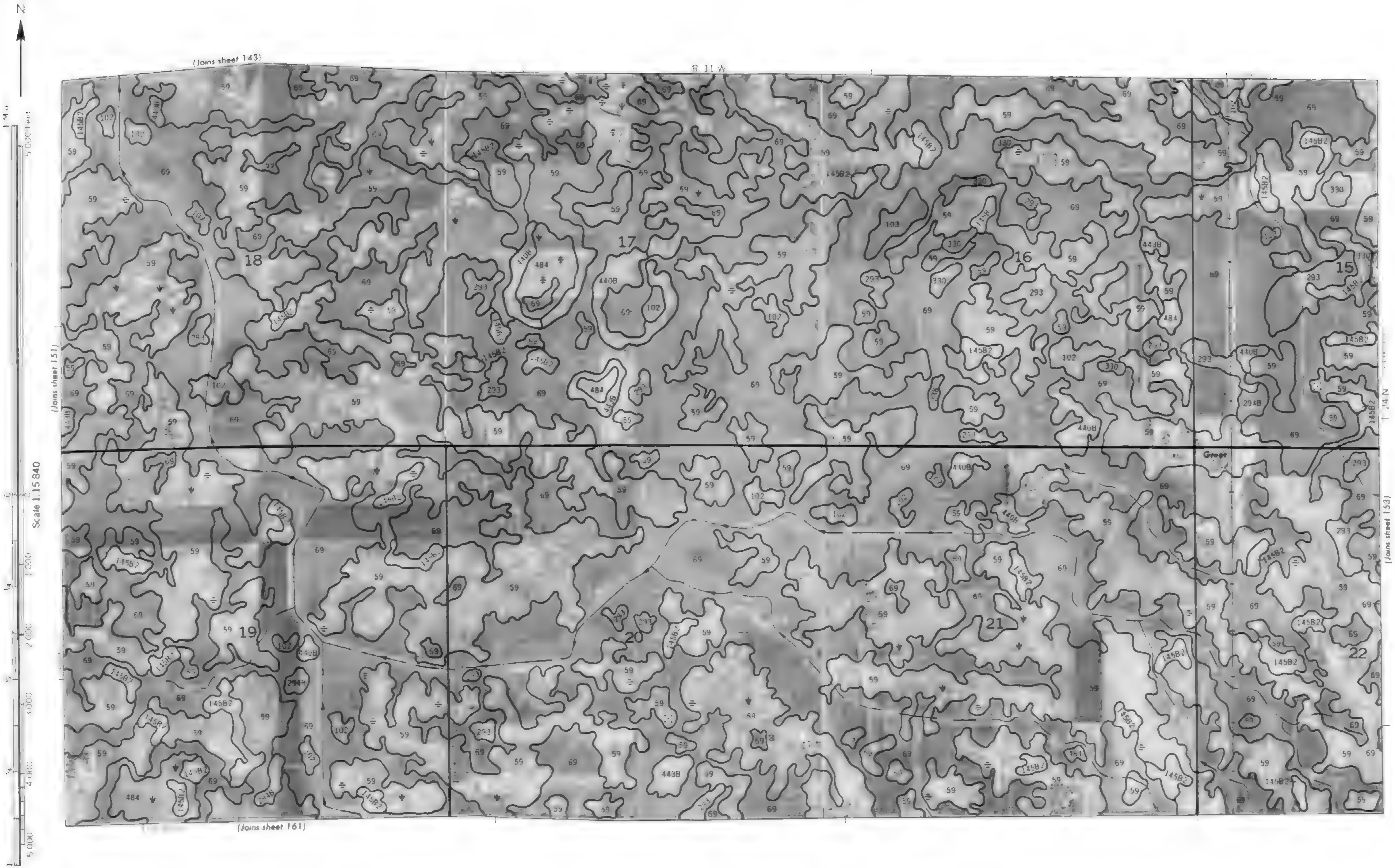

R. 14 W.
(Joins sheet 138)
(Joins sheet 148)
(Joins sheet 156)
(Joins sheet 146)
T. 24 N.
15
16
17
18
19
20
21
22
N
Scale 1:15 840

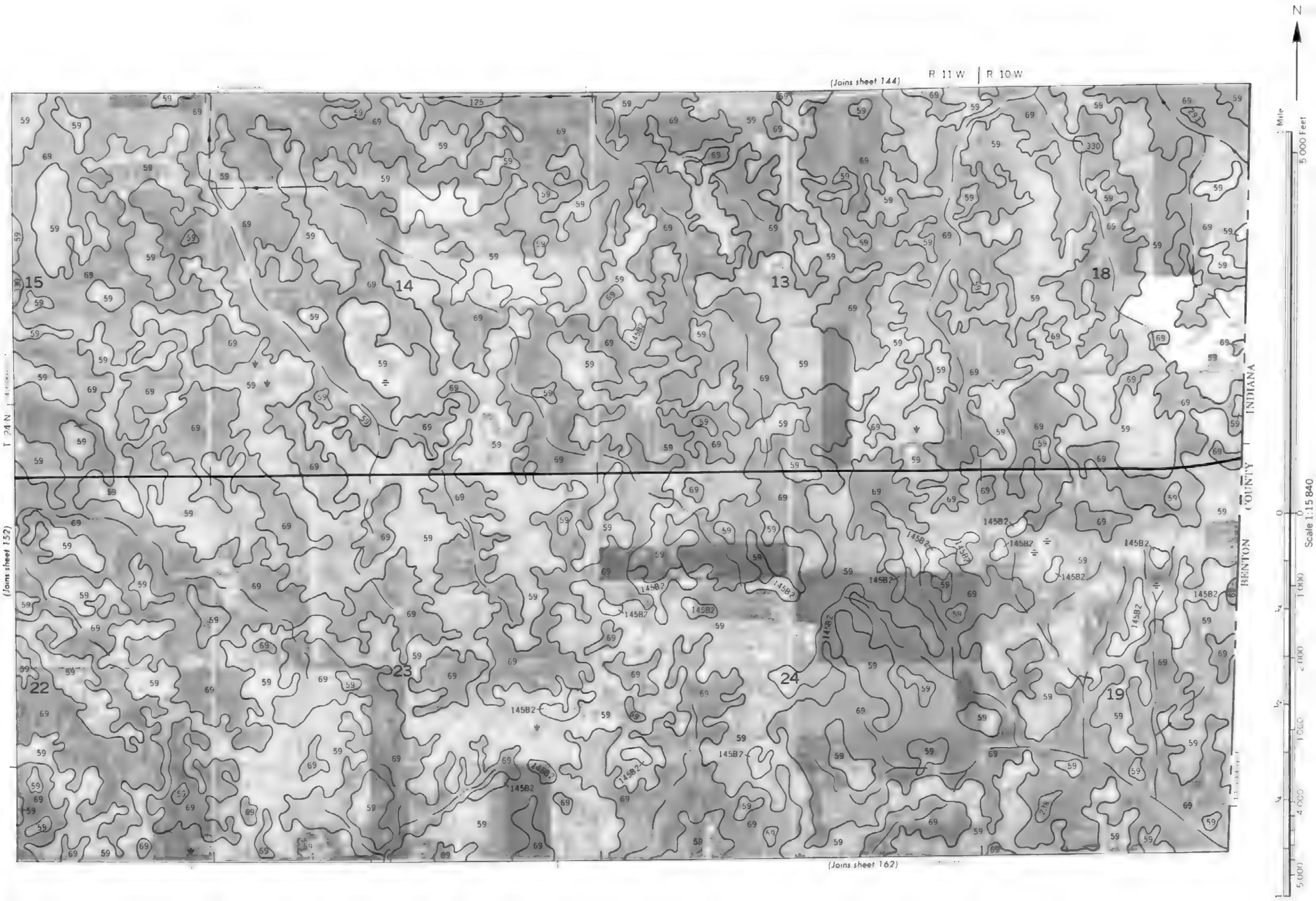

N
(Joins sheet 139)
R 14 W
R 13 W
(Joins sheet 147)
(Joins sheet 149)
(Joins sheet 157)
T 24 N
14
13
18
17
23
24
19
20
Scale 1:15 840


149
N
R 13 W
T 24 N
(Joins sheet 140)
(Joins sheet 150)
(Joins sheet 158)
(Joins sheet 148)
17
16
15
14
20
21
22
23
Whiskey
Creek
Fountain
Creek
Scale 1:15 840
0
1/4
1/2
3/4
1 Mile
0
1 000
2 000
3 000
4 000
5 000 Feet


N
(Joins sheet 141)
R. 13 W.
R. 12 W.
(Joins sheet 149)
(Joins sheet 151)
(Joins sheet 159)
T. 24 N.
13
18
17
16
24
19
20
21
Scale 1:15 840
1 Mile
0
5,000 Feet
1,000
2,000
3,000
4,000
¼
½
¾
59
69
235
145B2
293
153
484
288

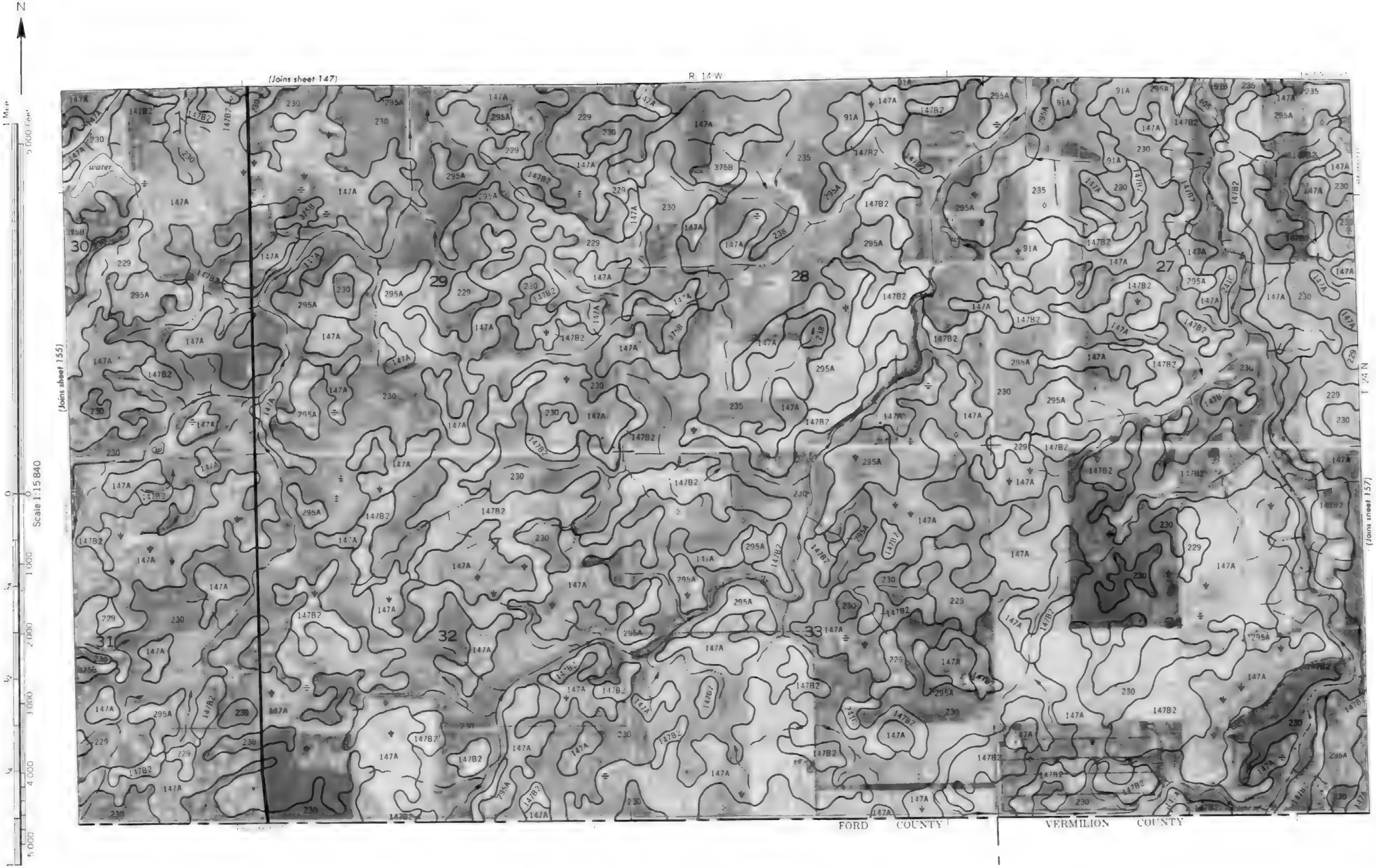

N
R. 12 W.
(Joins sheet 142)
(Joins sheet 152)
(Joins sheet 160)
(Joins sheet 150)
T. 24 N.
Wellington
Creek
13
14
15
16
21
22
23
24
Scale 1:15 840

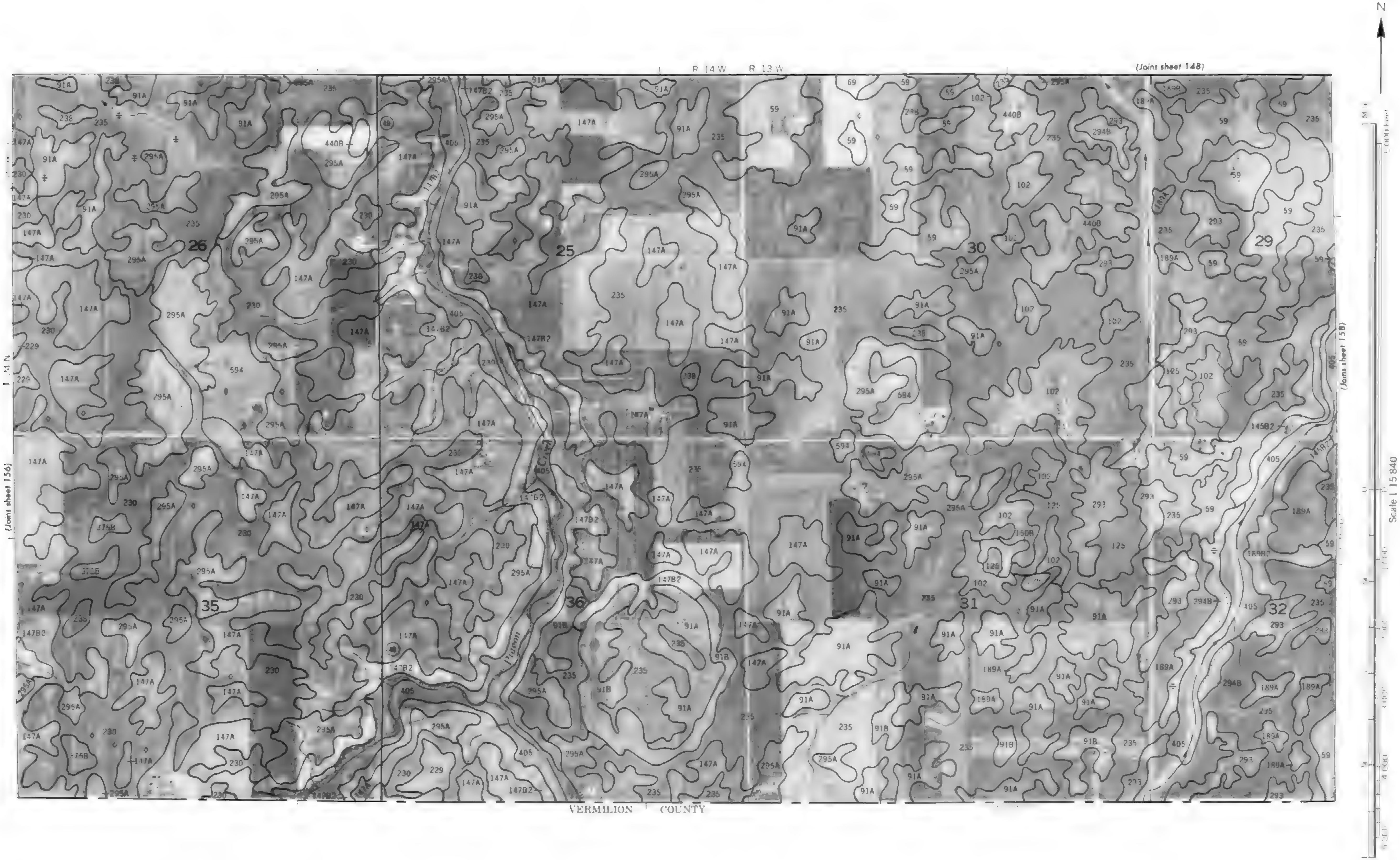

N
(Joins sheet 143)
R. 11 W.
(Joins sheet 151)
(Joins sheet 153)
(Joins sheet 161)
T. 24 N.
Greer
15
16
17
18
19
20
21
22
Scale 1:15 840
1 Mile
5000 Feet

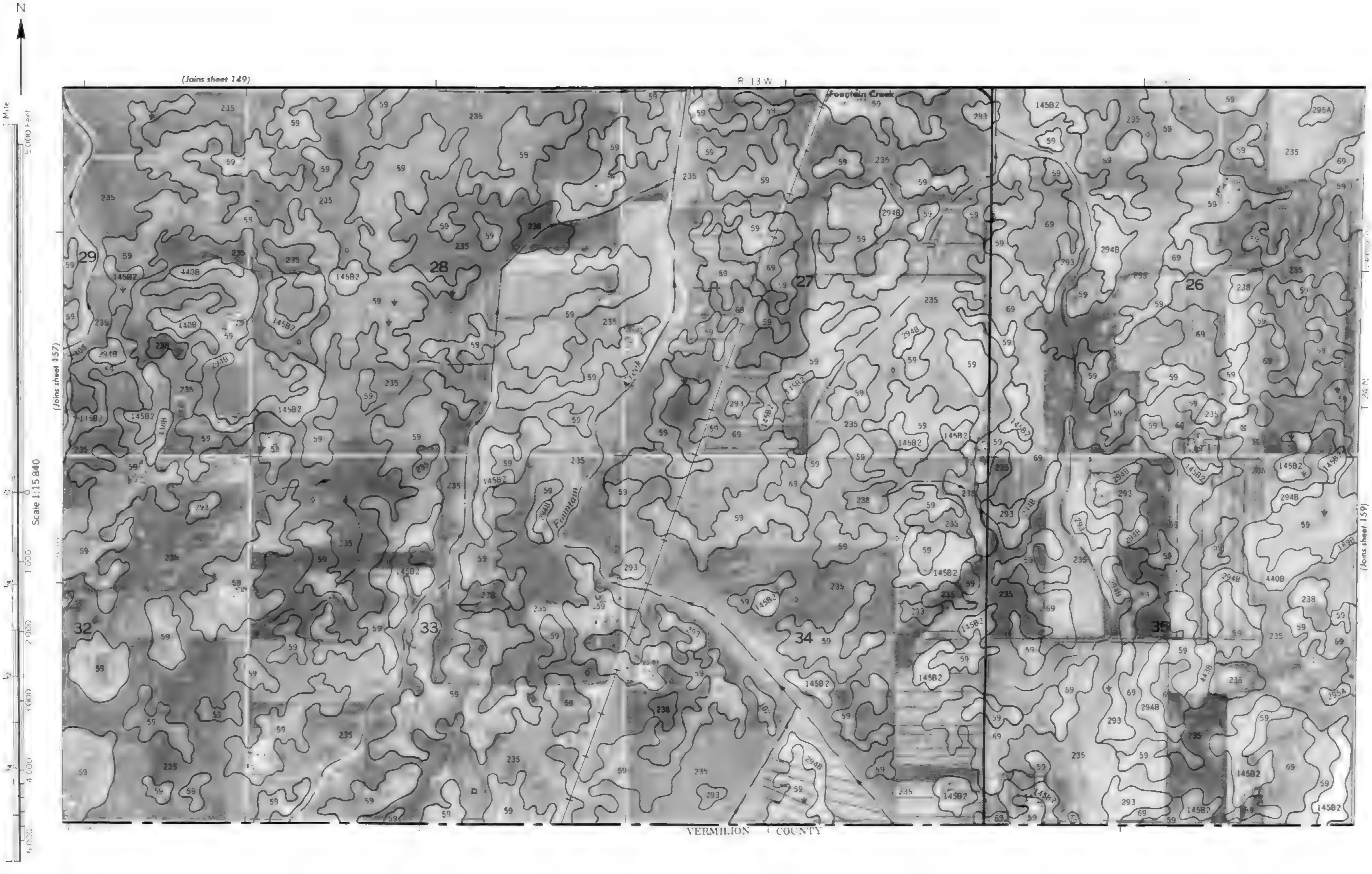

N
(Joins sheet 144)
R 11 W
R 10 W
T 24 N
(Joins sheet 152)
(Joins sheet 162)
INDIANA
BENTON COUNTY
15
14
13
18
22
23
24
19
1 Mile
5 000 Feet
Scale 1:15 840

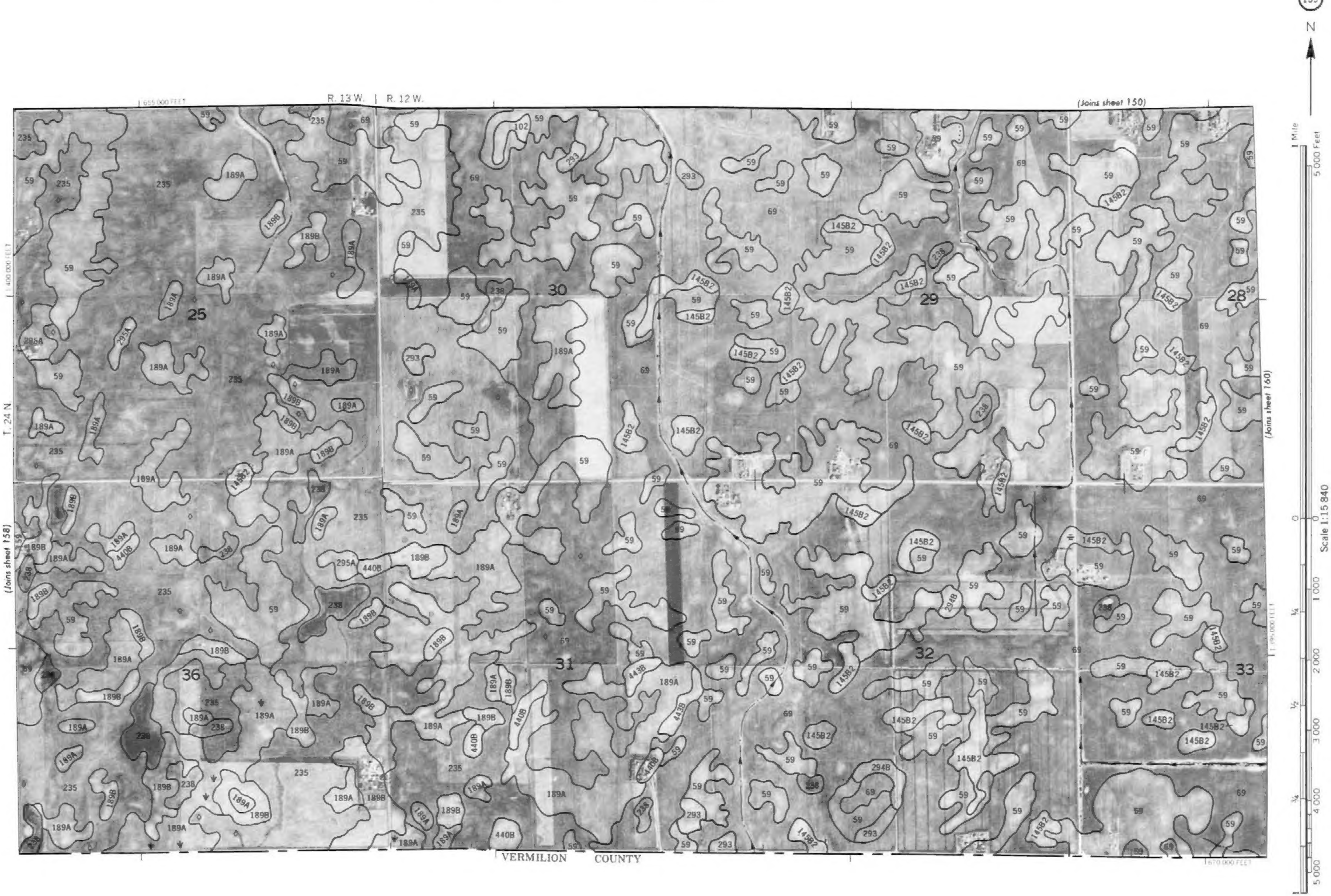

154
N
R 10 E
(Joins sheet 145)
(Joins sheet 155)
T 24 N
FORD COUNTY
FORD COUNTY
BAYLES LAKE
Scale 1:15 840
1 Mile
5 000 Feet


N
R. 10 E. | R. 11 E.
R. 11 E. | R. 14 W.
(Joins sheet 146)
(Joins sheet 154)
(Joins sheet 156)
T. 24 N.
FORD COUNTY
Scale 1:15 840
5 000 Feet
1 Mile
26
25
27
30
34
35
36
31

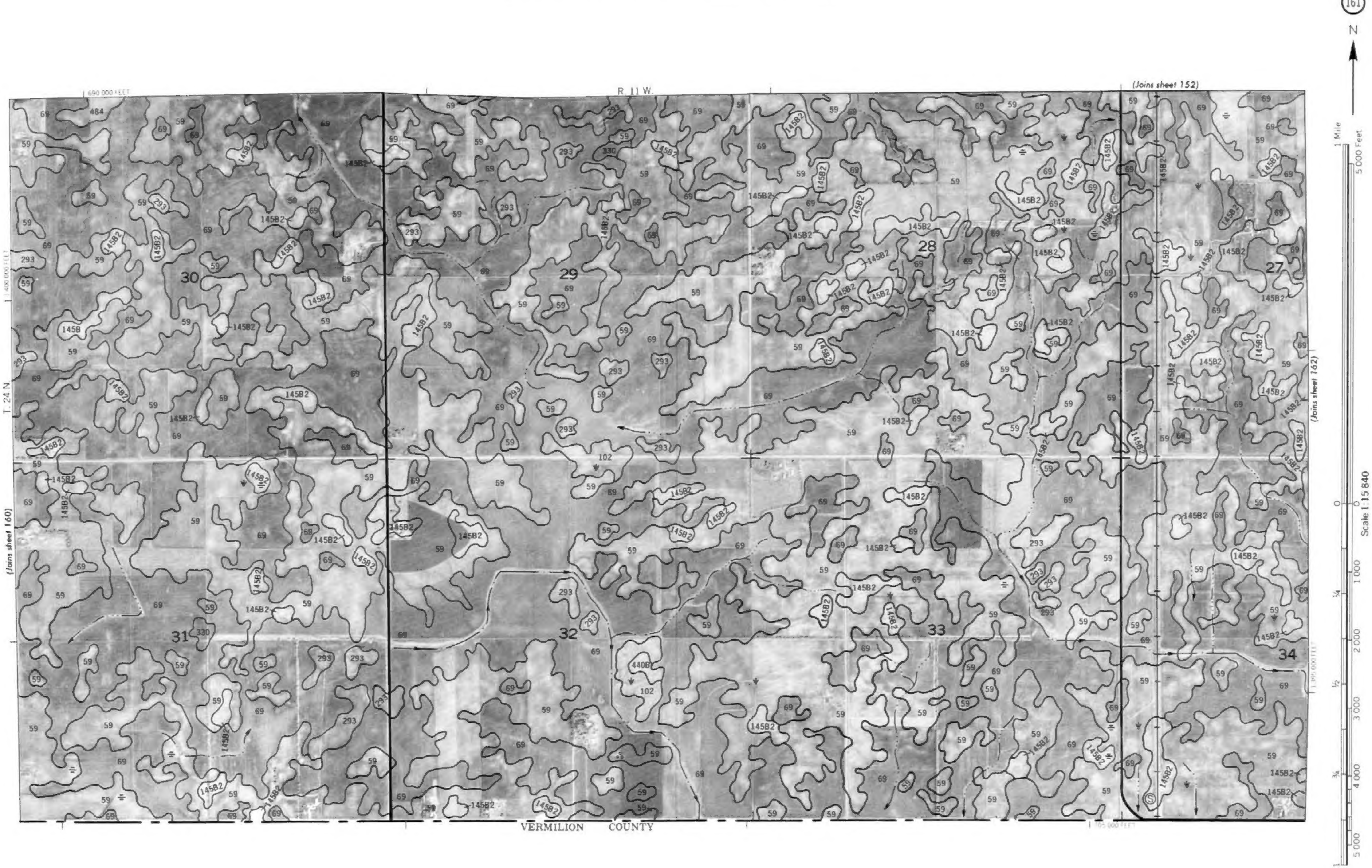

N
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000
(Joins sheet 147)
R. 14 W.
(Joins sheet 155)
(Joins sheet 157)
T. 24 N.
water
28
29
30
31
32
33
27
147A
147B2
230
229
295A
235
91A
375B
238
FORD COUNTY
VERMILION COUNTY


N
R 14 W
R 13 W
(Joins sheet 148)
(Joins sheet 156)
(Joins sheet 158)
VERMILION COUNTY
Scale 1:15 840
26
25
30
29
35
36
31
32


N
Scale 1:15 840
(Joins sheet 149)
R. 13 W.
Fountain Creek
(Joins sheet 157)
(Joins sheet 159)
24 N.
Fountain
Creek
29
28
27
26
32
33
34
35
VERMILION COUNTY


159
N
R. 13 W. | R. 12 W.
(Joins sheet 150)
(Joins sheet 158)
(Joins sheet 160)
T. 24 N.
VERMILION COUNTY
25
30
29
28
36
31
32
33
1 Mile
5 000 Feet
Scale 1:15 840
0
1/4
1/2
3/4
1 000
2 000
3 000
4 000
5 000


N
1 Mile
5 000 Feet
Scale 1:15 840
(Joins sheet 151)
(Joins sheet 159)
(Joins sheet 161)
R. 12 W.
T. 24 N.
685 000 FEET
675 000 FEET
Gay Creek
28
27
26
25
33
34
35
36
VERMILION COUNTY


161
N
(Joins sheet 152)
R. 11 W.
690 000 FEET
T. 24 N.
(Joins sheet 160)
(Joins sheet 162)
VERMILION COUNTY
705 000 FEET
30
29
28
27
31
32
33
34
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000

162


N
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000
¼
½
¾


(Joins sheet 153)
720 000 FEET
R. 11 W.
R. 10 W.
(Joins sheet 161)
T. 24 N.
INDIANA
BENTON
COUNTY
VERMILION
COUNTY
710 000 FEET
26
25
27
30
34
35
36
31